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ABSTRACT

The El Salvadoran educational reform policy called for a major revamping of previous educational goals and objectives. The basic questions of how these new goals might be achieved have been resolved through major administrative restructuring and by embarking upon the widespread use of educational technology, instructional television (ITV) playing the major role. A comprehensive cost-effective profile of the national ITV program is presented in this detailed report. An analysis of all phases of the ITV program and their interrelationships with the other educational units including baseline cost estimates, operational budgeting, and the handling of the educational deficit is presented. Of particular importance are the recommendations that the basic development plans must include more precise manpower objectives and that there is a great need for more effective ITV programming. (MC)

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ACADEMY FOR EDUCATIONAL DEVELOPMENT

EDUCATIONAL REFORM AND INSTRUCTIONAL TELEVISION IN EL SALVADOR: COSTS, BENEFITS, AND PAYOFFS

Richard E. Speagle

This is one of a series of reports of research on the Educational Reform Program of El Salvador, and especially its use of instructional television. This report has been prepared by the Academy for Educational Development, under contract with the Bureau for Technical Assistance of the U.S. Agency for International Development.

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2. The El Salvador Educational Reform: Some Effects of the First Teacher Retraining Course. Research Report No. 2. July, 1969. By Emile G. McAnany, Generoso Gil, Jr., Donald F. Roberts.*
3. Television and Educational Reform in El Salvador: Summary Report of the First Year of Research. Research Report No. 3. May, 1970. By Wilbur Schramm, Emile G. McAnany, John K. Mayo, Robert C. Hornik.
4. Television and Educational Reform in El Salvador: Complete Report on the First Year of Research. Research Report No. 4. July, 1970. By Emile G. McAnany, Robert C. Hornik, John K. Mayo.
5. Teacher Observation in El Salvador. Research Report No. 5. January, 1971. By Judith A. Mayo.
6. Feedback on Student Learning for Instructional Television in El Salvador. Research Report No. 6. February, 1971. By Ana Maria Merino de Manzano, Robert C. Hornik, John K. Mayo.
7. Television and Educational Reform in El Salvador: Complete Report on the Second Year of Research. Research Report No. 7. March, 1971. By Wilbur Schramm, John K. Mayo, Emile G. McAnany, Robert C. Hornik.
8. An Administrative History of El Salvador's Educational Reform. Research Report No. 8. November, 1971. By John K. Mayo, Judith A. Mayo.
9. Instructional Television in National Educational Reform. Research Report No. 9. November, 1971. By Wilbur Schramm (not yet released).
10. Television and Educational Reform in El Salvador: Report on the Third Year of Research. Research Report No. 10. March, 1972. By Robert C. Hornik, Henry Ingle, John K. Mayo, Judith A. Mayo, Emile G. McAnany, Wilbur Schramm.

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U.S. DEPARTMENT OF HEALTH,
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This is one of a series of reports of research on the Educational Reform Program of El Salvador, and especially its use of instructional television. This report has been prepared by the Academy for Educational Development, under contract with the Bureau for Technical Assistance of the U.S. Agency for International Development.

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INTRODUCTION

During the last four years the small Central American Republic of El Salvador has demonstrated an amazing will and capacity to introduce radical educational changes to stimulate her economic and cultural development. The reform has been headed by the Minister of Education, Lic. Walter Beneke, who was given a free hand by President Fidel Sanchez Fernandez. Apart from the decisive human factor, an additional critical element entered the picture: modern technology in the form of instructional television, a medium that has acted as the bearer and catalyst of reforms in curriculum, teaching styles and school organization.

The process of reform, still open-ended, will continue for years, no matter who succeeds to the Presidential Palace in 1972. A return to old ways is unthinkable. Further breaks in customary modes of thinking--in social values, health, family planning, agriculture and many more--are yet in store. Convinced as Salvadorans are of the possibilities of education, they also want to face pocketbook realities and see educational costs compared with the possible payoffs.

Beyond a systems phenomenon, some people see in El Salvador's mixture of personalities, technology and substantive reforms something like a chemical compound in which all ingredients are jointly necessary to achieve the desired effect. They take offense at separate pricing and appraising of individual components, particularly television. To them, Reform/ITV is an all-or-nothing proposition.

Close observers would agree that reform, without bringing the glamour and drama of ITV into the classroom, might have misfired. But one case does not make a principle. Many Salvadorans admit even less, and are inclined to decide about educational models and options on the basis of price and utility. Some contend that ITV is not worth the price of, for example, more schools.

Even if we accept Reform/ITV as a package deal, the amounts of each ingredient and the effects of alternative mixes lead to trade-offs. This opens the door to individual pricing, and that is tantamount to accounting for ITV as an optional accessory. The sponsors of this study wanted accounting and "accountability" information of this kind, subject to the special needs expressed by the host Government. Salvadoran emphasis, it is fair to say, is on total costs, particularly operating and capital expenses of reforms and television. Of great interest are the budget burden and cost comparisons between innovative and conventional modes of instruction.

AID's educational specialists go some steps beyond, asking for data on expense categories and on unit costs as instructional technology seeks to prove its mettle in the educational marketplace. Part of this interest stems from the inquiries of other countries anxious to exploit modern techniques like television if the price is right. If a flick of the switch could light up the screen and bring a tele-teacher with all the latest demonstration materials into every classroom, many problems of instructional quantity and quality might be solved.

The main purpose of this report then was to determine the costs of the Reform/ITV program of El Salvador and to evaluate their "affordability" and possible benefits. During the course of the project, however, as numerous people made their special interests and influence known, demands for information became essential conditions for securing full cooperation and gaining acceptability of the end product. These demands, apart from their purely technical specifications, were as follows:

- The Latin American Bureau of AID wanted the study to project the future path of the traditional Salvadoran education budget to 1980 and beyond, so that Reform/ITV costs could be piled on top of these "baseline" series. These data would help assess the burden of educational spending, with and without Reform/ITV, relative to the national budget.
- The Salvadoran director of ITV operations wanted emphasis placed on beneficial "payoffs" -- specific ways in which the facilities, when used for instruction as well as for broader educational purposes, could reduce program costs below traditional levels.
- The AID Mission and the Ministry of Education in El Salvador wanted to know the estimated price tag for recently announced official enrollment targets, including in these calculations the effect of a planned restructuring of the existing classroom-teacher configuration.

- For Minister Beneke, the usefulness of the report hinged mainly on detailed policy recommendations that would flow from the data and findings. Since the original assignment did not require entry into the educational policy area, such recommendations lie outside the principal purpose of this study and will be found in Appendix 1.

These requests went beyond a straight-forward cost-benefit study. However, they had to be reasonably well met within the time and budget frame of the report if the wider clientele were to view the work as successful and responsive to their needs. The instructions received constituted a rather diverse set of marching orders, complicating among other things the emergence of a coherent and logical organization of the report.

To match the study design with available resources, distinct limits had to be set as to the mission of the report. It is not a diagnosis, except in a tangential way, of the Salvadoran educational system as a whole nor an evaluation of its specific effectiveness in promoting teaching-learning transactions, an area in which members of Stanford University's Institute for Communications Research have been active since the start of Reform/ITV. This report is not intended to be a compendium of educational facts and figures, with its myriad of well-ordered and cross-classified statistics.

As to the latter, one should not exaggerate the problem of finding data nor that of their quality. Statistics are usable and are being considerably improved at the present, although the job of analyzing, sifting and comparing them was often time consuming--and costly. The study has been guided by the notion that a good capital budgeter ought to be cost-effective in his own work, which may help explain the numerous short-cuts and some lack of theoretical and mathematical elegance. Given the basic purpose of the assignment, this would merely be "gold-plating."

If this report begins to answer some questions about the costs of Reform/ITV with hard facts, immense credit is due to the Ministry of Education, namely: Sra. Adilia de Lievano, Budget; Ing. Edgar Martinez Montalvo, Statistics; Lic. Alejandro Armas, ITV; and Sra. Teresa Aguilar de Flores Canjura, Supervision. Strong sources of support and encouragement have been Sr. Carlos Orlando Clara, General Director of Administration; Dra. Irma Lanzas de Chavez, Director of the ITV Department; Lic. Gildaberto Bonilla, Director of the Normal School in San Andrés; and Lic. Roberto Murray Meza, Director of COPLACE. Many other Ministry people have been kind and helpful, but they are too numerous to name.

Of extreme value throughout the study was the consistent cooperation of Dr. Emile McAnany, S.J.; Dr. and Mrs. John Mayo; and Dr. Robert Hornik, all working under the direction of Dr. Wilbur Schramm of Stanford University.

At AID/El Salvador, I received advice and ample backing from Dr. Stanley Handleman, Education Officer, and his Deputy, Mr. Dwayne S. Rogers. Mr. Theodore Foley, Capital Loan Officer, generously opened his files for my use. The two groups of technicians working with Dr. Clifford Block and Dr. Louis Sleeper at AID/Washington provided constant guidance. Drs. Robert W. Schmeding and Daniel C. Rogers, both of AID/Washington, acted in the capacity of readers and critics; the study has substantially benefitted from rewriting based on their suggestions. To all of these kind people, thanks.

Lest this introduction be misinterpreted as a panegyric to Reform/ITV in El Salvador, let me observe that there is no lack of deficiencies in the system, as noted where necessary in this report. Educational leaders have often been showered with brick-bats for their "follies." But in balancing the books, I recall a foreign consultant who wrote that ITV was too difficult a technique for a developing country, and concluded that the job of successfully introducing and using it could not be done. El Salvador did it.

SUMMARY OF REPORT

The interlocking family of problems that make up what is known as the crisis in education are a topic on which much ink has been spilled. This report focusses on only one country, El Salvador, and one aspect, the financing of change and reform, or put differently, costs and allied benefits. El Salvador's experience teaches lessons that are valuable and, it is hoped, transferable to the solution of educational and training tasks for other countries, anxious to exploit the possibilities of modern communications technology and to harness them to their needs.

Findings on Costs

It is only a slight exaggeration to say that until the advent of reform--actually until 1971--the education budget of El Salvador went to support principally a primary school program, one characterized by a wide base in the first grade with steep attrition to graduation from the sixth. Upward of three-quarters of appropriations was spent on this sector of schools. Teachers' salaries constituted the main expenditure item, boosted by an administrative overload that during the last decade seemed to be growing rather than, as one might expect, shrinking with expanding student volume. Overburdened and underfinanced as the system was, very little money could be earmarked for adding to or improving physical plant and equipment, except when foreign loans came to the rescue.

Junior and senior high school attendance in recent years accounted for something like 15 percent of the Min/Ed budget, while cultural and ancillary activities had to make do with a minor share. These percentages are calculated to exclude transfer expenditures to autonomous institutions, like the university, where the Min/Ed played only the role of a budgetary umbrella.

The impression given was one of precarious sufficiency of financial resources to meet the system's minimal obligations. Accordingly, a most pressing initial question was whether El Salvador could afford the cost of reform. Especially instructional television had the reputation of being a highly expensive medium if not a luxury even for relatively well-off countries. The answer of this report under a variety of size-of-installation and of audience assumptions was that worries over affordability were much overdone.

Since their inception, ITV operations did not exceed 2 percent of the current budget, nor was the burden any greater when total ITV expenditures from domestic sources are compared with the corresponding total budget. A much higher ratio is likely to be shown in 1972 when the transmission equipment of the expansion phase will be acquired and have to be paid for, but this is not representative of normal conditions--it only attests the lumpiness and indivisibility of large investments.

When ITV operating costs are referred to grades 7-9 of junior high school only, they added something like 15 percent to the annual cost per student in 1971, a year when the number of viewers still reached no more than 25,000 students. This last figure, it should be pointed out, is a poor choice for a cost yardstick in television. The large unused capacity barred an adequate spreading of overhead costs, here to include the inventory of taped programs as well as broadcasting facilities.

A sticking point in Salvadoran policy regarding its television experiment relates to the desirability and advisability of extending coverage to the six primary grades, where the bulk of the school audience is located. A forecast of television costs, based on their past behavior, indicated that whatever barriers delayed the big leap into the mass market, they were not financial. The incremental costs of gearing up operations of an existing ITV system, once fully in place, to meet its rated capacity of program production and transmission seem of moderate proportions.

Substantive reforms outside television proper, such as teacher training, supervision of schools and curriculum revision carried so low a price tag as to warrant little space in a cost discussion. The only really expensive non-ITV item on the list was the AID and World Bank-assisted school construction program. It swelled the capital budget of 1971 significantly although the pressure on domestic funds was greatly relieved. School building in this instance was closely tied to several major reform objectives and hence counted as part of the reform rather than as a regular activity. Critics may have a point in calling attention to similar loan-assisted surges in school construction that took place long before the present reform became a reality.

The behavior of educational expenditures over time compared with the total national budget seemed to be creating a serious dilemma for El Salvador. The Min/Ed budget has been taking increasingly larger slices of the fiscal pie and by 1971 absorbed as much as 28 percent of central government revenues, compared with only 19 percent in 1960. Since El Salvador seems committed to increase her education efforts, one is hard put to see how the Min/Ed budget is soon going to stabilize, let alone decline. Equally hard to discern are any reasons why national resources should be growing much faster in the future, except for a radical boost in tax rates and collections. In plain, a fiscal confrontation seems to be in the making before very long. The outcome is difficult to foretell.

Efficiency Improvements

The inadequacy of the traditional education system was fully recognized both by Minister Beneke and the heads of the national planning office. The ultimate objective, of course, is to have all youngsters in the appropriate age brackets going to school. Short of this, more realistic near-term goals had to be set.

The main thrust of the reform was at the junior high school level, the pilot area for ITV which was scheduled to videotape one grade annually for three years. Simultaneously, the Min/Ed adopted nine years as the universal norm for school attendance. In effect, this meant adding three years to a curriculum whose first six years were badly in need of strengthening in substance and wider attendance.

To cost out some new enrollment targets, some proclaimed in the Minister's annual report, this study selected three plausible possibilities. The first, focussing on the intake of the system, was to keep all children, once they had registered in school, through the sixth-grade. The expense was jolting--as much as ₡24 million or a 50 percent override on the primary school budget--and enough to give pause to even stout-hearted advocates of educational progress.

The second target, grafted unto the first, was to offer all grade students an additional three years of junior high school. Since unit costs at that level are currently about three times those in the primary grades, the total operating cost amounted to a stupendous ₡100 million, or over twice the Min/Ed's present primary education budget.

The third proposal considered was a sharply scaled-down version of the second, namely to carry only all present sixth-grade graduates through the third cycle of junior high. The guiding rationale behind this enrollment plan was that students who had proved their staying power, whatever the cause, by finishing primary school were ranking candidates for retention through the full nine years of basic education. This target turned out to be well within the Min/Ed's pocketbook realities, carrying an annual price tag of ₵1.5 million in current charges.

The Minister and his advisors were well aware that the likelihood of financing any sizeable retention growth of the system would be greatly enhanced if the additional cost could be offset by savings elsewhere. Logical places to look for such savings were

- fuller utilization of existing school plants.
- better use of teacher time and available teaching hours.
- judicious reduction in the time students spend in class.

Increases in class size were only a theoretical possibility and largely beyond the control of policy since smaller than the desired large classes existed not by choice or conscious limitation but by dint of deficient enrollment, mainly in the upper grades.

The scheme evolved in the Ministry, named the "3-3-6" pattern, promised to bring about several important cost reductions: in operating costs, because a teacher would take on two grades daily instead of one; and in capital costs, because each schoolroom would house a double shift, accomodating one grade in the morning and another in the afternoon. The traditional pattern, by contrast, might be called "6-6-6" since each of the six grades possesses its own separate classroom complete with teacher.

Calculations showed that for a typical six-grade school operating at capacity, current expenses under the new pattern might be slashed by one-third and classroom investment by one-half. For actual budget planning, only a school-by-school survey could reveal the timing and incidence of accruable savings, partly because the changeover is being phased in gradually.

A likely disadvantage, not evaluated as yet, of the "3-3-6" schedule is that children will be spending about 40 percent less time in the classroom than formerly. Teachers will be carrying a heavier load--two grades instead of one--but will earn some extra compensation. At any rate, as seen through the eyes of a financial adviser, the Min/Ed can count on finding a good part of the money for its enrollment targets by changing over to the new, more economical double-shift use of classrooms.

Another plan for finding funds to pay for the expansion and qualitative improvement of the educational system is to speed up student flows by cutting down on the number of repeaters. Estimates indicated that something like one-fifth of occupied student places in primary schools were accounted for by someone repeating a grade. In high school, repetition is a rarity largely because students can make up failed examinations at a later date.

The potential savings available from lower or zero repeater rates, achieved one would hope through better learning under reform rather than merely through automatic passing, are of appreciable amounts. A complication, however, lies in divorcing diminished repetition from its possible consequence, due to encouragement of students, of higher retention. The cost of the latter could easily outweigh the saving from the former.

This would be blindly following accountants' logic. One repeated year less cuts down wastage. It reduces the average cost of putting a student through one grade and means a real saving per graduate. An extra year of retention, on the other hand, while it adds to costs, is matched by added educational output. Hence the budget may have to be augmented, but the unit cost per student-year in a given grade, in broad principle, would remain unaffected.

No reliable data have emerged so far about the effects of Reform/ITV on repeater rates, aside from some preliminary information which looks favorable. As for retention in the public system, one can say with assurance that a larger percentage of sixth graders are continuing to the seventh grade than previously after making due allowance for a shift away from private into public institutions.

An efficiency improvement of crucial interest to this study was epitomized by the question of how to utilize the ITV system most cost-effectively. At the first stage of analysis this meant holding effectiveness constant while observing the behavior of costs. The nature of large fixed capital inexorably puts the stress on the desirability of boosting volume of output. In television, this postulate translates into three dimensions of policy:

- Raising program output to keep studio personnel occupied and to maintain equipment humming.
- Increasing the number of educational projects to create a sufficient demand for programs and to keep the channels on the air as long as possible.

- Lifting the size of the audience per program to reduce unit costs per viewer-hour.

These three aspects are of course interdependent. Higher program production would follow immediately, say, upon an extension of reception to the heavily-enrolled primary grades. The same is true when teacher retraining or cultural broadcasting are adopted side-by-side with classroom instruction. For any given transmission, in turn, the more widely operating and allocated capital costs can be shared by a mass audience, the lower the unit expense of beaming the message to each viewer-listener. Broadcasting at the senior high school and university level would add to program volume, but the large audience per program would be lacking, and thus make this a relatively high-cost use of television.

The suggestion for multiple, seven-days-a-week and round-the-clock uses of channel capacity (and in a similar way of studios) sets up cost criteria at a subsystem level whereas the whole educational complex must be brought into the analysis. A fact of life in the use of ITV in El Salvador was that it constituted an add-on cost. Television was superimposed on the conventional classroom configuration. Every minute the screen was lit, a teacher was standing by. Pedagogically there may be reasons for the ubiquity of a teacher next to the set, although the evidence is thin, but situations must surely exist where teaching by television, with a monitor present at the most, is practicable.

This report investigated under what circumstances, from a strict cost standpoint, teaching by television alone might make sense. The finding was that, under a reasonable scale of studio output--a production of 2,000 of the standard, 20-minute programs--a feasible "break-even" point was reachable where ITV would match the cost of a traditional classroom-hour. Including all costs--operating, transmission and reception--this "break-even" volume consisted of an audience of 1,000 class-sections watching a given program. For still greater audience density, the cost per ITV-hour in the classroom could be brought sharply lower. Of course, each hardware configuration has its own unit cost patterns that appear when one tabulates a number-of-program and size-of-audience matrix.

The thrust of the findings is a plea for a well-instrumented "orchestra" of media, matched to the variegated teaching tasks to be performed. Each medium would be assigned to the job that it can do best. Programmed instruction, radio, audio-cassettes and group study are media not yet considered in El Salvador. If such a systematic approach was seriously undertaken, the chances are good that ITV could find its niche, a place where it could stand on its own feet. Assuming that learning effectiveness of television could be validated, so that some substitution of inputs makes sense, the message of the cost calculations is that ITV can compete as an economical teaching device in the existing Salvadoran school environment.

Benefits

The positive contributions of Reform/ITV to justify their cost can be classified under several headings:

- Savings and payoffs, mainly in areas other than or tangent to regular classroom instruction.

- Improvements in learning and in the learning environment.
- Greater system efficiency, such as diminished repetition, a faster absorption by students of a given information quantum, and a reduction of the standard number of years required for graduation.
- Higher lifetime earnings of graduates.
- Lower social overhead costs and qualitative improvements in the life of the individual and the community.

The estimated payoffs of ITV proved impressive. Television helped demonstrate that junior high school teachers could be trained in half the time it used to take under the traditional mode. The ITV-assisted classroom--this was not foreseen--without the need for further inputs by the Min/Ed functioned as an automatic in-service training device. The saving realized by this innovation alone was enough to offset the three-year cost of bringing television to the Plan Basico grades.

Of two planned multiple uses of ITV facilities, the primary teacher retraining project has already begun. The cost, by the traditional method of taking more than 15,000 primary teachers out of school and giving them intensive course-work in a teachers' college is beyond the reasonable reach of the budget, and is linked to an unacceptable "delivery date" of trained personnel. With ITV, it is believed, a well-sequenced, continuing series of programs can do the job within three years and at a fraction of the cost of a three-month project done the old way.

To call the above potential cost difference a "saving" would be inaccurate because the traditional technique is not within the realm of what the budget or the target date of the project would tolerate. Nevertheless, the bill for traditional retraining may serve as a benchmark wherewith to compare the cost under ITV. We counted this numerical difference as a possible payoff inherent in the television enterprise.

Similar considerations apply to a series of planned rural education broadcasts. A prototype of conventional rural extension, which leads a limping existence in El Salvador, constituted a point of departure for budgeting the operation on a larger scale. Here, too, television revealed distinct potential cost advantages. The joint possible payoffs in primary teacher retraining and rural extension about matched in magnitude the total investment in studios and transmission equipment, a weighty consideration in appraising the costliness of ITV.

The measurement of learning benefits from ITV did not turn out as satisfactory as was hoped. Limited experiments in 1969 and 1970 between two groups of relatively uniform classes, distinguished only by the presence of a receiver in one, failed to produce statistically significant differences in achievement tests. A rise in test scores attributable to television, while not a perfect yardstick, would have been a convincing demonstration of an increase in intermediate output, namely learning performance, of an ITV system. On the other hand, Reform/ITV as a package scored clear gains in learning performance over the old, traditional ways.

Proof of a more favorable learning environment due to Reform/ITV abounded. Results ranged from better teaching, as judged by modern standards of class participation and emphasis on problem solving, to heightened motivation of students as shown by attitude surveys and a strong preference for ITV-enriched classes. The companion study of Dr. Wilbur Schramm and his Stanford associates, on which this section of the report is based, treats this material in all the detail it merits.

A standard measure of benefits, and one appropriate for this kind of study, consists of incremental lifetime incomes to education. Under the conditions actually encountered in El Salvador, an attempt at building this kind of model--suspect already in the statistically sophisticated United States--threatened to be the most futile of academic exercises. Age-education-income profiles, the historical base for education-derived earnings, were unavailable. Second, a matter of later comment, the curricula were not oriented toward any particular vocational objectives, nor was a certificate from junior high school the condition for entrance into any widely held private or public occupation. Third, rampant unemployment undermined the supposition that a better educated youngster would get a better job. At best he might displace someone less qualified, so that in actuality a greater outlay for schooling under Reform/ITV would be invested in the same job and its associated output--a diminution of the social return to education investment rather than its hoped for opposite.

Qualitative benefits to education are still more speculative in nature. After review, they did not seem to offer a promising field for experiments in quantification at this time and within the constraints of completing this study.

The Lock-In Effect of Television

Some misgivings have been voiced about whether ITV truly lends itself to the pilot project approach or whether the introduction of the system constitutes an irreversible commitment, regardless of favorable or unfavorable outcomes. The principal barrier to abandonment of a television system once in place is the large investment in transmission and receiving equipment which would stand idle, a politically embarrassing reminder of administrative failure.

Taking El Salvador as an illustration, if a television experiment can ride piggy-back on the unused capacity of commercial channels, the outlay for hardware plus some temporary adaptation of existing building space into a studio could be kept to $400,000. The bill for receivers would be extra. Depending on the state of repair and elaborateness of classrooms, money would have to be spent to make them useable for viewing, but a good part of this expenditure could be considered as a sprucing up and modernization of schools, desirable even without television. One may conclude, therefore, that experimentation with instructional television may be possible without giving excessive hostage to the future.

Actually, El Salvador has now gone beyond the pilot stage, and over $2.5 million in foreign grants, loans and Salvadoran treasury funds have been spent so far. One could claim, as some dissidents have, that these funds could have been spent for such alternatives as building 1,200 primary schoolrooms that are badly needed. This argument ignores, of course, the dramatic and catalytic role that television played in putting an integrated reform plan, going far beyond brick and mortar, into action.

Some Recommendations

Suggestions for policy decisions were framed mainly to respond to Salvadoran initiatives and are to be found in Appendix I. A recommendation to expand the planning function, formed early during the writing of this report, became superfluous when the Min/Ed decided, on its own, to go ahead with this proposal, without need for outside prodding.

A serious gap in the educational system is the lack of even approximate, let alone well-defined, manpower objectives. Only a comprehensive national plan can fill this gap if it is designed to generate sufficient private and public investment, in the cities and on the farms, to create jobs for the rapidly growing labor force.

The task of producing and implementing a viable development plan, and not merely on paper to impress foreign lenders, is one of extreme difficulty and urgency. Beyond this terse comment, the present report--not being addressed to the subject of national economic and social planning--has little to say. The ground swell of educational demand and aspirations in El Salvador is such that it will not be contained by uncertainty about precise goals nor a wringing of hands. A decent education is conceived to be one of the preconditions for any kind of desirable job, beyond any theoretical postulate that education is a priority item in achieving technological development. But there are disappointments waiting at the end of the road for the products of the new basic education when one observes university graduates driving taxicabs. The budding teen-age population, saturated with high expectations, may be a time bomb for the social fabric of El Salvador.

The final suggestion is one that appears over and over in this study: the great need for more effective ITV programming. The present deficient state of the theory of learning, and *pari passu* of teaching, links progress in program production with an enlightened empiricism and vigorous experimentation. There is no shortage of promising hypotheses about the learning process, but efforts to put them to work, to match them with learning objectives and curricular specialties, to plug them into experimental program modules, to evaluate them through the use of feedback and tests, so as to keep improving the product of the studio, are rare. Korea promises to do valuable work along these lines. Hardware technology has gotten so far out in front of teaching techniques that one is tempted to call for a moratorium on spending for new instrumentation until a better balance can be struck as, hopefully, software catches up with the magic of electronics. A glint in the eye of the ITV managers is the possibility of regional programming. In such fields as science, mathematics and foreign language high quality programs should be acceptable anywhere in Central America. A regional production laboratory with representatives from neighbouring countries on the staff sharing design and production responsibilities would promote the attraction of the videotapes by television stations elsewhere. Such arrangements would open up immense new audiences and could result in dramatic cuts in unit costs.

PART I

BACKGROUND AND PROCEDURES OF STUDY

El Salvador's Setting

Salvadorans are keenly aware that theirs is the smallest country in Central and mainland Latin America. The highway from the Guatemalan border in the east to the Honduran border in the west can be crossed in merely a day. The national territory of a little over 8,000 square miles--roughly the size of New Jersey--contained a population in 1971 of about 3.5 million, something like 440 inhabitants per square mile. The rise in population has been about 3.2 percent in recent years. An official projection estimates that if demographic trends continue the population may be over 10 million by the year 2000, or about 1,250 people per square mile.

The promise of technological success that characterized instructional television in El Salvador could be largely ascribed to the combination of a small territory and a great density of a potential audience, two conditions essential for the transmission efficiency of the medium.

The form of government is republican and the ruling party, supported by the armed forces, seems to have a secure grip on the reigns of power. While one might describe the central political tendency of the government as leaning toward the conservative, the label fits poorly in the field of education where the pressure for innovation and reform has been intense.

The national university, as in many Latin American countries, is a focus of agitation for radical social changes. The militant leadership of the teachers' union found much support in that quarter during recent strikes conducted not only over wages and working conditions but also in a broad sense over educational policy.

It is clear even to the casual observer that the country is strongly agricultural. Pending the results of the Census of 1971, one may accept a figure of 60 percent of the economically active population as being engaged in farming. Coffee is the main export crop, accounting consistently for over one-third of agricultural output. Other exports are diversified, but animal husbandry, cotton and fresh fruit deserve some special mention. This background has some obvious implications when it comes to orienting the educational system toward manpower targets.

During the last decade, agriculture has decreased from over 30 percent to something like 25 percent of an expanding gross domestic product while manufacturing has climbed from about 15 percent to 20 percent. Industrialization has advanced somewhat. The rest of the economic sectors, which show a stable pattern, are led by wholesale and retail distribution which makes up about 23 percent of GDP.

To give some idea of the pace and magnitude of job creation outside of farming and mining, in San Salvador, the capital, the number of positions rose from about 62,000 in 1962 to 83,000 in 1969. This is about 3,000 new jobs annually. Industry, construction, commerce and transportation each provided about 4,000 new posts during this seven-year period, with services and government responsible for the remainder. These figures might be compared with the number of non-continuing graduates (to the seventh grade of Plan Basico) pouring out of primary schools in El Salvador--10,000 from the sixth grade alone, without counting drop-outs, high school and university graduates.

The Educational Pyramid

Education in El Salvador is basically a public concern. Private schools have relative importance only at the high school level, are largely affiliated with the Catholic Church, and receive no budget support from the state. A small kindergarten population of about 20,000 children exists, apparently for only a few children, starting with age four. The bulk of students initiate their schooling and are concentrated in the primary grades, where over 530,000 were enrolled at the beginning of 1970. The drop-out rate after the first grade is staggering, continuing with diminishing severity and reflected in the fact that there is only one student in the sixth grade for every fifteen in the first grade at any given time. This strongly tapered pyramid of student flows, partly influenced also by enrollment growth and the queuing effect of repeaters, demonstrates considerable wastage. The educational cost implications are obvious.

Further attrition in the student body takes place in transit from primary to secondary school although the success of recent reforms has sharply boosted the retention rate into junior high school. Some 50,000 students in 1970 attended the Plan Basico grades 7-9, almost one-half in private institutions. A shift of students toward public schools is under way and has reduced the above percentage to one-third in 1971. Nine years of school or three cycles make up the "basic education" to which all

Salvadoran children are entitled according to the newly passed Education Law.

One should mention here vocational schooling at the junior high school level, not requiring the Plan Basico curriculum. In 1969, the latest available figures showed an attendance of 14,000 youngsters studying mainly to be bookkeepers and office workers.

The senior high schools, about to undergo some deep-seated curriculum changes, offer several career-oriented courses of study, besides offering the traditional curriculum leading to entry in the university. About 25,000 students attend.

Of the two institutions of higher learning in the country, one is the national university which has some satellite regional campuses; and the new and expanding Catholic University, financially assisted by the Inter-American Development Bank. Over 9,000 students had matriculated in 1970.

History and Content of Reform

A history of the Reform movement was the topic of a special paper by Dr. and Mrs. John K. Mayo of Stanford University, so that a brief review may serve at this point. Discussions about and some halting steps toward the use of instructional television go back to the early sixties, but a clear vision and action plan toward integrated educational reforms coincided with two events. One was the elaboration of the National Five Year Plan of 1968 - 1972, prepared by a central agency known as CONAPLAN; and second was the appointment as Minister of Education of Lic. Walter Beneke in 1967.

The problem of financing ITV was resolved when President Johnson agreed to United States sponsorship through AID. The other planks of the reform program, costed out in the body of this report, had by 1971 come to include the following:

- Curriculum revision, from the primary grades through senior high school.
- New study materials and the provision of text-books.
- Teacher training and retraining, and the reorganization of the teachers' college.
- Revamping and reorganization of the supervisory system.
- Streamlining of the administrative machinery in the Min/Ed.
- A new building program, embodying a changeover to the so-called "3-3-6" system of double shifts per classroom.
- Goals for expanded enrollment and retention in primary and junior high schools.
- A new system of vocationally-oriented senior high schools, based on new facilities.
- Creation of the Central American Technological Institute, to prepare middle-level technicians.
- Physical education and additional sport and recreation facilities for both students and teachers.
- The expansion and formalization of the planning function in the Min/Ed.
- The preparation and passage of a new general Education Law (no explicit cost assigned).

It is easily appreciated that Minister Beneke's approach was not piecemeal but that it addressed itself to all the main components of the system under his care.

The Place of this Report in the El Salvador Education Project

To set this report into its proper niche within the El Salvador educational project, one must look at it from the vantage point of the Education Officer at AID/ES, in charge of promoting the enterprise as a whole. First, in virtually all of the fields of reform just listed, foreign technical advisors were recruited by the United States, Great Britain, Japan, UNESCO, the World Bank, and others. In the case of AID-sponsored advisors, each submitted periodic and end-of-tour reports covering the substance of his experience and specialty. This substantial body of information cannot be summarized here.

Second, as a key element of the project, Stanford University under the guidance of Dr. Wilbur Schramm, fielded a team and organized an evaluation section in the Min/Ed which monitored the ITV operation in depth, with the purpose of measuring effectiveness. It seemed only natural to try and match this with a study of costs, and that was the primary mission of this study. As explained in the introduction, various influential Salvadorans kept pressing for policy-oriented information which, while cost-related, had not been part of the original study design.

Instrumental in getting the new planning office started in early 1972 was a study completed by Dr. Russell G. Davis of Harvard University. His colleague, Dr. Manuel Zymelman, had earlier prepared a preliminary paper on the feasibility of a manpower study to provide direction in the formulation of education goals.

In sum, a great amount of material bearing on the reform program has been produced by the various participants and specialists in support of foreign grant and loan assistance. The present report and the work of the Stanford group, however, place their heaviest emphasis on the technically most advanced, challenging and controversial part of the reform, instructional television.

Methodologies

The variety of demands for cost and benefit information required different techniques of data search and quantification. School statistics, such as enrollment by grade, number of teachers, status of buildings and classrooms etc., seemed to be of reasonable reliability. However the data, being multivariate, were classified into many subpopulations. The possibilities of diversity are shown by such categories as urban and rural; public and private; and night and day classes. Further, questionnaires to collect these data were issued three times a year, typically in February, May and October.

Publishers of educational statistics such as the Ministry of Economy and CONAPLAN sent their own representatives to pick up desired figures from the work sheets in the Min/Ed. This procedure proved to be a fertile ground for discrepancies and inconsistencies. Comparative analysis failed to give assurance that any particular compilation was necessarily the correct or the most reliable one. A definitive job of reconciling differences was plainly out of the question, but data gathering for policy information permits a wider band of tolerance for imprecision than would be true of an econometric survey. Due to personnel changes in 1971, the seriousness and professional attitude in collecting and processing data in the Min/Ed improved visibly. Under the auspices of the new planning office further progress seems to be in the cards.

Budget figures, a second most vital part of the data base, are produced in three stages: through initial requests by administrative units; after appropriations agreed to by the Congress; and when funds have been spent and committed after the fiscal (here calendar) year. A most important dividing line in the budget separates the operating and capital budgets, the latter covering investment outlays. Infrequently special budgets make their appearance to take care of unexpected or emergency expenditures that cannot be met by internal transfers or by changing existing allocations during the fiscal year.

The budget itself is organized by programs, broken down into subprograms and activities which correspond to units charged with their execution. All budget items carry codes, permitting rapid identification by spending unit and category. The most detailed description of program objectives; of personnel and material inputs required; of organization tables; of planned outputs; and of criteria for later evaluation are set forth in the initial budget proposals (*ante-proyectos*). Although programs as adopted by the Legislature often vary widely in form and amount from the projected plans, the latter give the closest insight into the purpose, nature and structure of each activity. These documents are not published. It is to the credit of the administrators of the Min/Ed and to the spirit of cooperation that prevailed that these materials became available. We respected and tried to deserve this confidence.

The program budget as passed by the Congress is published and includes a virtual line-item break-down of positions and salaries. The least detailed budget record pertains to actual outlays which are audited by the Accounting Court (Corte de Cuentas), and later on published by the Ministry of the Treasury. A full understanding of program costs and their underlying operations, therefore, requires working with three sets of data. Finally, the proper interpretation of the statistics hinges on personal interviews with the people directly involved in each program and activity.

The primary purpose of this report, of course, was not data collection but data analysis for policy decisions. One question posed was whether El Salvador could afford the ambitious Reform/ITV plans on top of already large and growing regular expenditures. To answer this, a baseline projection of the budget to 1980 and beyond was required to which the additional reform costs could be referred. Affordability was also evaluated by the relation of education to total national spending. This was carried out by mechanical trendline extrapolations, cross-checked by an analytic projection based on enrollments and unit costs.

The identification of reform activities interspersed through the many dependencies of the Min/Ed took time although costing them thereafter was a fairly straight-forward calculation. Figures for grant funded technical assistance and equipment outlays, derived from the ledgers of the controller of AID/ES, needed some disentangling and search for underlying documents to yield specifics on spending objectives and category.

A number of cost items of ITV were minor, buried in the accounts, and for present purposes assigned a value of zero. To counter such understatements, some obvious small adjustments that would have reduced the cost figures were left aside to balance the omissions. In order to err (where some error seemed inevitable) on the conservative side, the study adopted, when a choice presented itself, the higher cost estimate.

The lack of age-specific enrollment data stood in the way of constructing more precise models of student flows in certain cases where evaluation was called for. Examples included the diverse cost impact of lower repetition rates; of greater student retention; and of several growth targets of the Min/Ed. However, simplifying assumptions permitted approximations that fixed the cost or savings magnitudes desired within such limits as decision-makers normally require.

The computation of payoffs under the Reform/ITV mode and other tasks of measurement necessitated some choices in the treatment of imputed costs. Where the accounting system was clearly incomplete in booking costs, as was the case in the neglect of depreciation, proper allowances were made. On the other hand, a factoring in of imputations for the cost of capital seemed to invite unnecessary and purely academic controversy, extraneous to the specific objectives of this report. The various comparisons and analyses presented here did not require the assignment of largely arbitrary "opportunity cost" values to educational investments. This issue, of course, would have to be reexamined in the context of national planning, or in the ranking of spending proposals in the social as against, say, the agricultural sector. No such questions came up. These matters will be found discussed in greater depth in their appropriate place within the study and its appendices.

PART II

FINDINGS ON COSTS

Overview of Cost Structure

As a beginning, it may be useful to take a quick look at the overall structure and magnitudes of El Salvador's educational budget, and to identify some key features. These will be discussed in more detail later in this report as they bear on the thrust and financial burden of Reform/ITV. Attention may here be called to the following:

--The overwhelming bulk of the budget in recent years has gone into operations. Capital expenditures are a very minor component unless, as in 1971, significant foreign funds become available (Table 2.1). This is true whether one looks at the Ministry's own direct spending or whether one includes budget funds immediately transferred to autonomous educational institutions (mainly the National University). At least three-quarters of the operating budget went for primary education. However, funds for the high school program have been increasing, impelled by growing enrollment in grades 7 to 9--the old plan basico and the focus of Reform/ITV.

--Reform-related current expenditures, such as those for ITV, supervision and teacher retraining, have been extremely modest within the total budget. The same has been true for Reform-induced investment outlays until 1971, when the launching of World Bank and AID-financed school construction programs changed the pattern. The installation of the new television station in 1971 is an exceptional outlay, but an expense not soon to be repeated.

TABLE 2.1

Costs of Public Education in El Salvador by Major Categories and Programs 1967-1971

(In millions of colones)

Item	1967	1968	1969	1970	1971 1/
I. Operating Budget (Excl. Transfers)	45.8	49.1	52.9	55.9	64.9
a. Primary Education, Grades 1-6 2/ 3/	39.6	43.0	43.1	44.9	45.3
b. High School Education 2/ 4/	4.5	5.0	7.8	8.8	15.8
Junior High School Grades 7-9	-	-	-	-	10.0
Senior High School Programs 5/	-	-	-	-	5.8
c. ITV Operations 6/	-	-	0.7	0.9	1.1
d. Cultural and Ancillary Programs	1.7	1.1	1.3	1.3	2.7
Memo Items, Included Above:					
e. Distributed Overhead	1.7	5.9	4.3	6.2	6.0
f. Supervision Program (Reform)	-	-	0.1	0.1	0.4
g. Teacher Retraining (Reform)	-	-	1.6	2.1	1.0
II. Direct Investment (Excl. Transfers)	1.2	1.7	0.7	3.6	29.4 7/
a. ITV Project	-	0.1	-	0.6	4.4
b. Reform-related Education Facilities	-	0.6	0.1	1.7	24.9
c. Regular Construction Activities	1.2	1.0	0.6	1.3	0.1
III. Operating Transfers	8.8	10.5	11.9	14.3	15.2
IV. Capital Transfers	1.5	1.3	1.3	1.1	1.8
V. Total Budget of Ministry of Education	57.4	62.7	66.8	74.9	111.3

Totals may not add due to rounding.

¢2.5 = $1.00

Footnotes at end of table.

TABLE 2.1 (Continued)

Costs of Public Education in El Salvador by Major Categories and Programs
1967-1971
(In millions of colones)
(Percentages of Total Budget of Ministry of Education)

Item	1967	1968	1969	1970	1971
I. Operating Budget (Excl. Transfers)	79.7	78.2	79.3	74.7	58.3
a. Primary Education, Grades 1-6 2/ 3/	69.0	68.4	64.6	60.1	40.8
b. High School Education 2/ 4/	7.8	8.0	11.7	11.7	14.1
Junior High School Grades 7-9	-	-	-	-	9.0
Senior High School Programs 5/	-	-	-	-	5.1
c. ITV Operations 6/	-	-	1.1	1.2	1.0
d. Cultural and Ancillary Programs	2.9	1.8	1.9	1.7	2.4
II. Direct Investment (Excl. Transfers)	2.4	2.7	1.0	4.8	26.4 7/
a. ITV Project	-	0.2	-	0.8	3.9
b. Reform-related Education Facilities	-	0.9	0.1	2.3	22.4
c. Regular Construction Activities	2.4	1.6	0.9	1.7	0.1
III. Operating Transfers	15.3	16.7	17.8	19.0	13.7
IV. Capital Transfers	2.6	2.4	1.9	1.5	1.6
V. Total Budget of Ministry of Education	100.0	100.0	100.0	100.0	100.0

1/ Fund Utilization basis except for Appropriation basis in 1971, adjusted as of July.

2/ Estimates based on direct costs plus administrative overhead prorated on that basis.

3/ Includes small kindergarten program.

4/ Includes all programs beyond the primary grades, other than university courses.

5/ Specifically includes ₡1.2 million for Teachers College and ₡800,000 for Technological Institute.

6/ ITV Operations in 1967 and 1968 were minor and are included in (d).

7/ Utilization of as much as ₡12 million in 1971 is contingent on Loan 014 becoming operational before end of year; otherwise funds will be spent in 1972 and later.

Sources: Ministry of the Treasury, Informe Complementario Constitucional, 1967-70 and Presupuesto Por Programas, 1971.

To avoid misunderstanding later, the character of these accounting data and their bearing on the study should be clarified at the beginning. The figures shown in Table 2.1 are the costs of public education as they appear to the Ministry, which has to pay the bill. Contributions from rural communities, such as self-help school construction, the printing of certain workbooks or the now abolished payments by local parent-teacher associations are excluded. So are gifts and grants from foreign nations. If, as expected, future teachers take out tuition loans, these costs will disappear from the list of public expenditures. Interest on domestic and foreign education loans comes from the Treasury Department, and so do teachers' retirement payments. Personnel, facilities and consulting assistance offered by other Ministries, are excluded. Most of these omissions are of little importance but are cited here as background for the table.

The importance of the budget accounts lies in the fact that they constitute the financial basis of educational policy-making. For other purposes, however, other cost frameworks are appropriate. To compute the total educational expenditures of El Salvador, private institutions would have to be included. These costs are relatively unimportant except at the high school and university levels. With rare exceptions, the private institutions depend on their own resources.

In the context of this report, two main departures from the budget system may be noted. First, donations are a cost of reform programs even if borne outside the country. Second, certain operating costs have been "capitalized" as start-up costs, and so have some temporary investments, too short-lived to be amortized. This raises a relevant point.

Accounting is an art. Differing practices are accepted by the profession as a matter of individual judgment, even though such differences in treatment often seriously affect balance sheets and income statements. This report has aimed at a rule of reason and, in borderline cases, at conservatism so as to permit some short-cuts and economy in the gathering of data. The end result, it is hoped, represents a fair reflection of Reform/ITV in its most prominent cost contours and cost variables, within a tolerable margin for error. The purpose was not an audit. Policy, to the formulation of which this study expects to make a contribution, is, after all, not based on the counting of pennies.

Costs in a Traditional Education System

Interest in what the cost of education in El Salvador might be in the absence of Reform/ITV stems from an uneasiness that possibly spending levels are already so high that loading on costly innovations would break the budget's back. Investigation showed this hunch to be uncomfortably close to the mark, as explained below. A saving grace, however, was the relative bargain that major reforms, inclusive of ITV, turned out to be either in actuality or in potential future applications. This last point, already hinted at, will be discussed more fully in a later chapter.

People have become used, even hardened, to the fact that when educators talk about innovation or reform they are about to ask for more money, and when the conversation turns to media like computers or television the amounts are likely to be out of sight. It is further understood that the request for funds will be in addition to any existing educational budget, given the extreme rarity of savings or tradeoffs due to lessened expenses elsewhere in the system.

This plot, in essence, seems to meet the situation in El Salvador. Reform costs, in the absence of information to the contrary, threaten to become burdensome add-ons to the prevailing budget base.

The first step in evaluating the burden of reform costs, therefore, is to estimate the baseline budget for a reasonable planning horizon, say, ten years ahead or more. The resulting series of expenditure estimates forms an imaginary expansion path for the budget, steeped in the Min/Ed's fiscal history and generated ultimately by the country's demographic momentum. This path may be thought to reflect "normal" growth. By definition, it would be a natural baseline: the locus of all points of reference for alternative spending proposals, bound to be inflated by the cost of major Reform/ITV options.

Projection by Trendline

Rarely is reality as accommodating to models representing this kind of theorizing as it proved to be in El Salvador for the years 1964-70. The operating budget of the Ministry of Education traced an almost straight line on a graph with a vertical logarithmic scale, suggesting a compound rate of growth of about 7 percent (Table 2.2).

A surprising feature of this finding was the apparent submergence, to the point of invisibility within the budget totals, of many easily identifiable Reform/ITV outlays that occurred during 1968 and 1969 and even in greater variety and volume during 1970. An outsider looking at expenditures would not receive the slightest hint from this "low profile" of anything out of the ordinary. One must surmise, without making a minute survey of line items, that in these early years the money for reform programs came out of funds that otherwise might have reinforced regular activities. Familiarity with financial policy and practice in the Ministry makes that view credible. On the other hand, the sums called for, as shown later in this report, were anything but extravagant. Only by 1971 did Reform/ITV gather enough steam to put its unmistakable stamp on total educational expenditures.

"Operating transfers" is El Salvador's nomenclature for funds included in the Ministry's budget but destined for more or less independent entities; in this case those outside the Ministry of Education's direct spending control. The addition to operating expenses of these "current" transfers, benefiting chiefly the autonomous National University, produced another smooth line on the graph, higher in position of course and this time at a slightly steeper angle of inclination.

The final component needed to obtain grand totals for the Ministry

TABLE 2.2

Budget Expenditures of Ministry of Education, El Salvador Actual 1964-71 and Baseline Trend Estimates, 1975 and 1980 [1]

(In millions of colones)

Budget Categories	1964	1965	1966	1967	1968	1969	1970	1971[2]	1975e	1980e
(1) Educational and Cultural Operations	38.3	40.2	43.2	45.8	49.1	52.9	55.9	64.9	80.0	110.0
(2) Transfers for Operating Purposes	4.0	5.7	6.9	8.8	10.5	11.9	14.3	15.2	*	*
(3) Capital Outlays	3.0	8.7	7.3	2.7	3.0	2.0	4.7	31.2	*	*
(4) Total Min/Ed Budget	45.3	54.7	57.4	57.4	62.7	66.8	74.9	111.3	115.0	165.0
Memo: Major Subcategories:										
Included within:										
(1) Cultural Activities	--	--	--	1.7	1.1	2.0	1.2	1.9	*	*
(2) Operating Transfers to National Univ.	--	3.8	5.0	5.0	8.1	11.5	13.3[3]	14.8[3]	*	*
(3) Transfers for Capital Purposes	0.8	1.5	1.5	1.5	1.3	1.3	1.1	1.8[4]	*	*

e - Estimated   * - Not estimated separately   Note: Totals may not add due to rounding.

[1] Calendar years. Figures, except for 1971, are on a "utilization of funds" basis, that is cash expenditures plus commitments of funds. (Some commitments may be subject to cancellation, to a minor extent, in subsequent years).

[2] Budget appropriations as approved and adjusted upward by July 1971 from an initial amount of ₡96.8 million. The year 1971, being the first strongly under the influence of Reform/ITV expenditures and related foreign loans, is excluded from estimating procedures; it is listed only for information purposes.

[3] Includes funds for scholarships.

[4] Made up of ₡1.5 million for the National University of El Salvador and ₡300,000 for the Catholic University "Simeon Cañas".

Source: Ministry of the Treasury, Informe Complementario Constitucional, 1964-70, and Presupuesto Por Programas, 1971.

of Education budget is capital expenditures, which fall under two headings. (1) Direct investment, usually the bulk of the item, covers all outlays under the Ministry's immediate supervision. (2) "Capital transfers" again applies to investments executed by independent units in the Ministry's orbit, of late meaning almost entirely the National and the new Catholic Universities.

The graph resulting from superimposing capital expenses on operations, or, what amounts to the same thing, the graph representing the overall education budget, shows moderate fluctuations around an upward trend of about 8 percent. The progression during the period 1960-70 was smooth enough to justify drawing a freehand straight-line trend through the coordinates, a short-cut for more time-consuming regression equations. This procedure also avoided conveying an impression of spurious accuracy; for that same reason, no attempt was made to establish non-linear correlation.

Analytic Projection Based on Unit Costs

A mechanical projection, if consistent with the historical performance and internal logic of a given time series, is a perfectly satisfactory device of forecasting. Still, its validity is immensely enhanced if it can gain the backing of an analytic model which explains, in good part at least, the behavior of the whole in terms of its strategic variables. More generally, if two or more forecasting techniques, applied to the same series, yield similar outcomes, the reliability of the projections as well as the credibility of the estimating models are greatly strengthened.

What we did, in summary, was to project primary and secondary school enrollment on the base of the underlying school-age population; next to multiply these student totals by their respective unit operating costs; and then to top this product by a percentage surcharge that would cover the Ministry's ancillary and cultural activities. We next applied appropriate historical coefficients for operating transfers and capital outlays and, with the aid of these multipliers, arrived at projections for overall Ministry of Education spending. A final adjustment proved necessary to allow for an upward drift of unit costs evident during the past decade.

In spite of Spartan disdain for elaborate statistical refinements, our final analytic estimates agreed well with the previous mechanical trendline projections for 1975, a year near the end of the second proposed five-year plan. For 1980, as explained below, the fit was good for the total Ministry of Education budget and somewhat on the high side for the operating portion. Intermediate years, where desired, could be estimated by interpolation on the graph (Table 2.3).

It might be further observed that these estimates made no allowance for rising unit costs at the secondary level, prior to the onset of reforms a relatively modest program. The repercussions of inflation--the cost of living in El Salvador as measured by the budget of a working man's family rose by about 10 percent between 1960 and 1970--are, however, fully reflected within our much steeper adjustment for the 4 percent annual climb in primary school unit costs during that period. The methodology of the projections is covered in greater detail in Appendix II.

TABLE 2.3

Baseline Estimates of Budget of Ministry of Education, 1975 and 1980

Item	Amount 1975 (In millions of colones)	Amount 1980 (In millions of colones)
A. Freehand Trend Projections, Based on 1964-70		
(1) Operating Budget (Excl. Transfers)	80.0	110.0
(2) Total Min/Ed Budget	115.0	165.0
B. Analytic Estimates, Based on Unit Costs		
(1) Operating Budget: Low Estimate	78.0	112.7
High Estimate	89.9	134.4
(2) Total Min/Ed Budget: Low Estimate	90.0	128.0
High Estimate	118.0	176.0

Sources: (A) Extrapolation of data shown in Table 2.2

(B) From computations shown in Appendix Table A-2.5

Education's Rising Claim on National Financial Resources

A projection of the budget for any single one of El Salvador's ministries must pass muster according to a rule of reason. Its order of magnitude must fit comfortably into the dimensions of the overall national budget, so that its historic percentage share be neither too small nor excessively bloated when related to available funds.

The straight-line projections of the overall Ministry of Education budget seemed to flunk our particular test, and by a widening margin as time went on. Against the background of a linear projection of the national budget, the Ministry's portion over the last ten years climbed from about 19 percent to 28 percent assigned by the Congress in 1970 (Table 2.4). As matters worked out during that last year, however, the education "appropriation" was cut back somewhat, while the national budget expanded moderately, thus reducing the actual ratio to only about 25 percent. By mid-1971, however, due to foreign loans and matching Salvadoran contributions, the ratio again hit 28 percent.

Within five to ten years' time, if this trend were to continue, the Ministry of Education's proportion could easily climb to one-third, thereby putting ministries with rival claims under a severe squeeze for program money. The freehand estimate for the year 2000 is not a believable figure and leads to conclusions discussed below.

These measures of education's share of the national budget deserve attention for two other reasons. First, the projected ratios so far reflect only baseline trends, without any overlay of the costs of major reform targets. These could only exacerbate the danger of an approaching financial clash at the Cabinet level. Second, the relation of the Ministry of Education's budget to national income in 1969 showed nothing like any outlandish concentration of funds on the educational sector: quite the opposite held true. El Salvador's ratio of less than 3 percent compares with a standard UNESCO recommendation of 4 percent, which leads to a strong suspicion that something may be amiss in the country's fiscal efforts.

TABLE 2.4

Share of Ministry of Education in Total National Budget of El Salvador

Actual 1960-1971 and Trendline Estimates for 1975, 1980 and 2000

Year	(1) Total Min/Ed Budget	(2) Total National Budget	(3) Ratio (1):(2) (Percent)
	(In millions of colones)		
1960	32.4	174.3	18.6
1961	38.5	182.5	21.1
1962	39.5	180.0	21.9
1963	41.2	186.3	22.1
1964	45.3	204.6	22.1
1965	54.7	239.0	22.9
1966	57.4	250.1	23.0
1967	57.4	236.6	24.3
1968	62.7	234.4	26.7
1969	66.8	291.9	22.9
1970	74.9	303.3	24.7
1971	111.3	380.0 1/	27.5
1975e	115.0	380.0	30.4
1980e	165.0	500.0	33.0
2000e	800.0	1,500.0	53.5

e - Estimates based on freehand trendlines fitted through data 1960-70.

1/ Initial figure of ₡366 million raised by the ₡14 million upward adjustment applied by the Assembly to the Min/Ed budget, chiefly to account for AID loans approved in March, 1971.

Source: Same as Table 2.2

Speaking bluntly but factually, a possible explanation lies in deficient tax and customs collections. If these could be stepped up, as has happened in certain other countries of Latin America, the central government's "take" of national income might be great enough to avoid the current "crowding" of the Treasury by new education programs. This topic, however, is not in the mainstream of the present inquiry.

A Note on Administrative Overhead

A word may not be amiss at this point on the behavior of bureaucratic costs over the years. Early conversations with Ministry officials about projection techniques sustained the hopeful hypothesis that administrative expenditures as a proportion of the Ministry of Education's budget would drop as the system gathered in a larger number of eligible pupils. A slower increase of outlays for operations should therefore explicitly be taken into account. Experience proved unkind to this precept.

A rough experiment of comparing central administrative expenses of the Ministry of Education between 1960 and 1970 led to the opposite conclusion. Instead of falling, the ratio of these outlays to those for total operations rose from about 7 percent to 11 percent. A closer review, particularly of the two larger management accounts, confirmed this finding. The offices of both the top directors and central administrative staff of the grade-school program accounted for larger shares of total operating expenses in 1970 than in 1960.

The basis for this comparative rise in Ministry overhead is not obvious. Endemic pressures to add personnel, sometimes politically inspired under chronic conditions of unemployment, undoubtedly played a part in El Salvador as they have in other developing countries. "Parkinson's Laws" are always at work in growing systems. On the other hand, educational programs have undergone considerable changes in the last ten years, capped by major reorganizations between 1967 and 1970 which may have interlarded new layers of authority. A precise tracing of administrative functions is a laborious task better left to specialists.

The above comparison touched only the main managerial functions in the Ministry of Education itself, without concerning itself with administration at the school level. Further, we excluded the various cultural programs from review. A more detailed study of the administrative history of the educational establishment, covering not only expenditures but also employees by activity, hierarchal level and job classification, would make an excellent thesis topic for some Salvadoran graduate student.

The Message of Baseline Projections

The possibility of bringing the two types of baseline projections into fair agreement instilled some confidence that we were not too far from defensible and realistic estimates of baseline budget figures on which to calculate later incremental costs of Reform/ITV. A note of caution, however, is appropriate.

The free-hand trendline for the total Min/Ed budget, if prolonged to the turn of the century, gave a reading of ₡800 million for the year

2000, equal to over one-half of a similarly derived value of ¢1,500 million for the national budget. That is an impossible event. It is also a convincing argument that the long-range growth of the education expenditures must sooner or later decelerate in relation to total government revenues. What the political circumstances surrounding such a braking of expansion will be is hard to guess. There may be a show-down over the slowing down of outlays for schools.

At this point it is worth remarking that in 1971 both educational and national spending have taken a sharp upward turn from their more placid decade-long baseline movement. The former jumped by ¢36 million or 48 percent and the latter by ¢77 million or 25 percent. Such increases cannot be maintained in monetary or real terms. Yet the reform movement, as will be shown later, is light-years away from meeting the enrollment targets enshrined in the new Education Law.

Undeniably, educational needs and fiscal resources are on a collision course. However, resolve and ingenuity, Latins' long suit, may delay the moment of truth. And there is always the chance that the slack in tax collections will be taken up. The idea of school bonds is still unheard of. The immediate problem for El Salvador is "how to get from here to there." New patterns of school scheduling, like the "3-3-6" pattern, plus ITV and other advances in teaching technology seem poised to facilitate progress toward the country's national aspirations.

The Bill for ITV: An Overview of Costs and Budget Burden

For obvious reasons this report dwells at some length on the cost behavior of the new and expanding television operation. To facilitate an understanding of the dynamics of ITV in a developing country such as El Salvador, only a detailed, in-depth treatment will do. But as the wealth of detail is likely to become somewhat overwhelming, it seems advisable to pull the various threads together in an initial review of the relevant costs. The main conclusions are as follows:

- The total bill for ITV as a separate accounting component of reform between 1966 and estimated 1973 comes to no more than about ₡18 million, or roughly $7 million (Table 2.5).

- About half of the cost of ITV is being financed by grants and loans from foreign sources, predominantly the United States through AID, and only about one half from internal funds.

- The bulk of the money so far has been spent, as is to be expected, for hardware, buildings and technical consulting services. Operating costs have been modest by comparison and, while rising, are leveling out.

In sum, the burden of the ITV Department on the budget of the Min/Ed has been minimal and will continue to be so (Table 2.6). Operating expenses of television have not exceeded 2 percent of current Ministry outlays, normally through their large relative size the focus of both

TABLE 2.5

Total Cost of Instructional Television
1966-1973
(In million of colones)

Item	Totals	1966-1967	1968	1969	1970	1971	1972-1973
MAJOR CATEGORIES	(All Sources of Funds)						
A. Operating Costs							
ITV Department	5.2	-	-	0.7	0.9	1.1	2.5
B. Investment Costs							
Transmission Equipment	4.7	-	0.1	0.6	0.1	3.9	-
Reception Equip.	1.0	-	1/	0.1	-	0.3	0.6
Building and Air Conditioning	1.1	-	-	-	0.6	0.3	0.2
Remodeling of Classrooms	2.3	-	2.3	-	-	-	-
Subtotal	9.1	-	2.4	0.7	0.7	4.5	0.8
C. Non-Recurrent Start-Up Costs							
Pre-Production Planning, ITV Department	0.7	0.2	0.5	-	-	-	-
Technical Assist.	3.2	-	0.3	0.8	0.6	0.5	1.0
Subtotal	3.9	0.2	0.8	0.8	0.6	0.5	1.0
D. Total Cost	18.2	0.2	3.2	2.2	2.2	6.1	4.3
	(Foreign Sources of Funds)						
E. Grants and Donations							
Investment Costs	1.0	-	0.1	0.7	0.1	0.1	-
Technical Assist.	2.7	-	0.3	0.8	0.6	0.4	0.6
Subtotal	3.7	-	0.4	1.5	0.7	0.5	0.6
F. Foreign Loans							
Investment Costs	4.8	-	-	-	-	4.2	0.6
Technical Assist.	0.5	-	-	-	-	0.1	0.4
Subtotal	5.3	-	-	-	-	4.3	1.0
	(Domestic Sources of Funds)						
G. Use of Salvadoran Funds							
D - (E + F)	9.2	0.2	2.8	0.7	1.5	1.3	2.7

1/ Small shipment of receivers included under transmission equipment.

Sources: Ministry of Education, ITV Department; AID/ES, Controller's Office and Education Division.

TABLE 2.6

Budget Burden of ITV in El Salvador
1968-1971
(In million of colones)

Item	1968	1969	1970	1971
ITV Costs of Ministry of Education 1/				
(1) Operating Costs	0.5	0.7	0.9	1.1
(2) Total Costs	2.8	0.7	1.5	5.6
(3) Use of Domestic Funds only 2/	2.8	0.7	1.5	1.3
Budget Expenditures of Min/Ed				
(4) Operating Expenses	49.1	52.9	55.9	64.9
(5) Capital Expenses	1.7	0.7	3.6	29.4
(6) Subtotal	50.8	53.6	59.5	94.3
(7) Transfers to Universities and "Government Corporations"	11.8	13.2	15.4	17.0
(8) Total Min/Ed Budget	62.6	66.8	74.9	111.3
Budget "Burden" of ITV				
(9) As percentage of Operating Budget (1) : (4)	1.0%	1.3%	1.6%	1.7%
(10) As percentage of Operating and Capital Budget (2) : (6)	5.5	1.3	2.5	5.9
(11) Domestic Funds as a percentage of Total Min/Ed Budget (3) : (8)	4.4	1.1	2.0	1.2

1/ Items (1) and (2) exclude foreign grants but include loan funds.

2/ Excludes foreign loans.

Sources: Same as Table 2.5.

executive and legislative scrutiny during the budget process.

Spending for ITV on both current and capital account, exclusive of transfers, has been a somewhat more noticeable part of the total Min/Ed budget, but much of the weight was taken off, first, by grant funding of equipment and, later on, through financing afforded by low-interest AID loans. The largest of the "burden" ratios of the ITV portion of the direct budget of the Ministry--5.9 percent in 1971--was reduced to only 1.2 percent in terms of domestic funds utilized. Interest on these borrowings has been deferred and repayment of principal, unless refinanced at maturity, is some time off.

These last "burden" ratios of ITV are conservative: if transfer expenditures had been included in the denominator, to make it the total Min/Ed budget, the percentages would be smaller still. The relation of ITV to Plan Basico operating costs is discussed in Part III.

A possible--perhaps imminent--expansion of the television system to cover the first six grades portends no major financial obstacle. No great burden of capital expenditures for ITV looms on the horizon: after 1971 a hiatus of perhaps a decade will reign until central transmitting equipment may have to be replaced. In the meantime, additional channels could be put into operation if needed at only about $50,000 a piece. The sets are equipped to receive them.

The acquisition of additional receivers required for rural extension and primary teacher retraining would be a substantial but not insurmountable expense. To give an idea of financial magnitudes, at ¢500 per receiver for 12,000 primary classrooms we are talking about an outlay of about ₡6 million or a loan of $2.4 million. There are rumors of bringing the cost of sets down substantially through a long-term contract with some Asian suppliers, but whether these sets could match the virtually meintenance-free operation of the present American models is a question.

To bring television to the early grades, some remodeling of schools would be necessary for something like 9,000 classrooms, after giving effect to the results, actual and expected, of the past AID Loan 003 and the future Loan 014. The two construction programs largely financed by these loans provide at least 3,000 modern classrooms. At an average cost of adaptation for ITV of about ₡300 per classroom, as experienced in the recent junior high school program, we are talking about a bill in the range of ₡3 million, well within the allocation normally set aside by the Min/Ed for routine school construction and improvements. The countrywide power grid makes the availability of electric current a minor engineering and cost problem.

To terminate this overview of the cost data, a joint use of television facilities for general educational programs, including uses by other Ministries, would bring the cost to be allocated to instructional television down to possibly three-quarters of the total bill for this medium.

The Economics of ITV

The full panorama of ITV in El Salvador comprises three fronts on which the medium is playing a significant role. First, as a catalytic agent, television has been the spearhead of reform, its mere presence at the core of instruction heralding the advent of twentieth century technology.

Second, viewing the educational problem of El Salvador in its broadest possible terms, we must define it as a need to transmit vast amounts of information--including a tremendous backlog--to millions of inhabitants. Just as the printing press overcame the bottleneck of the illuminated manuscript, so television proposes to break the transmission barrier represented by the voice and communication capability of the classroom teacher if unaided by modern media.

In third place, any productive activity--and formal education surely must be so classified--requires controls over quality and rhythm of output. Television delivers the message entrusted to it with a maximum of signal strength and a minimum of the extraneous "noise" that often confounds human channels. In addition, when properly used in conjunction with the teacher as "learning manager," television acts as a pacemaker, seeing to it that the curriculum is imparted in an orderly and timely fashion.

On the minus side, technology generally imposes a discipline of its own which may exact a price in terms of human adaptation. Without conjuring up the regimentation so often associated with the assembly line, a videotaped program may produce unresponsive, lock-step teaching unless questions and answers, problem-solving or other catch-up pauses are deliberately sandwiched into the presentation. Two-way communication systems which allow for audience-tele-instructor interaction do exist, but they introduce additional elements of cost which, for this report, have not been considered.

All these observations have their economic side which is the focus of this study. Prior to detailed cost calculations of ITV, however, it may foster a better understanding of some of its inherent complexities if, right at the beginning, we call attention to some key points in the discussion to follow:

- Current, capital and start-up costs have their own special characteristics and hence are best treated separately as well as jointly in total costs.

- The strategic measure on which to fasten attention is unit cost--illustrative possibilities include cost per program, per class-hour or per student-hour--because policy decisions often hinge on a comparison of ITV with alternative, competitive educational media.

- Initially a heavy user of capital, television is subject to pronounced economies of scale: the wider the audience watching a program, the easier to distribute the overhead and reduce unit costs.

- The cost of a program is quite intimately, although not in fixed proportions, tied in with its "quality"--a synonym for learning effectiveness which urgently counsels us never to divorce these two elements in our thinking.

ITV Operations

At the time of writing, ITV is located in temporary and rather crowded quarters at the "Teachers College" in San Andrés. Nevertheless, it constitutes a distinct entity within the Min/Ed, represented by a separate program within the budget. This facilitates the identification of major expenditures by amount, type and purpose.

Activities are currently organized into eight sections which functionally fall under the two headings of administration and production. The former includes the Director's Office, an Accounting and Budget Section, and General Services. The telecasts themselves depend on the important Production Section which is the heart of programming; the Studio and Plant, linked by microwave to two leased commercial channels; a Materials Section which prepares audiovisual materials, a Storage Center for props; and an Evaluation Section in charge of testing and feedback to help heighten program effectiveness.

Since it takes more than just money to make the delivery of televised instruction work, a more detailed description of what goes on at San Andrés will provide some background for subsequent accounting considerations. The center of the stage, quite literally, is occupied by so-called "production teams," one for each grade and subject matter, which control what goes over the air. When not producing entirely new series of programs a team, consisting of five professionals, is kept busy revising and retaping old ones. The task typically is divided as follows.

The spade work is done by the subject area specialist, of whom there are usually two per team in, say, mathematics. The specialists's first step is to determine, on the basis of a 34-week school year, the class-time available which may run, in a specific subject, from 130 to 170 hours. His second task is to match the content of the official curriculum in its most recently revised version with the block of time at his disposal. This involves chopping up his subject matter into appropriate teaching units. These lesson plans are then finally translated into two distinct but closely related formats; a teacher's guide and a student workbook.

The volume of written material for student workbooks runs to between 250 and 300 pages per subject and area, and to about 200 pages for guides. Tables, designs and illustrations make up something like one-half of total available space. As a maximum, therefore, this output may reach 2,500 pages for the five subjects in each grade -- Spanish, mathematics, natural sciences, social sciences, and English.

In 1971, it was possible to deliver the entire set of teaching materials in one shipment to the printer, at which point costs were taken over by a central patronato, a private agency representing parent associations in the communities where junior high schools are located.

The point has now been reached where the "tele-teacher" can evolve a script for his lectures, which as yet lack stage directions or audio-visual inputs. These latter components are next supplied by the stage director whose job, in large part, is to produce a complete, annotated script indicating sound effects, the use of slides, movies, and stage properties as well as camera positions. At the time of taping, the show is his responsibility. He is aided by the "coordinator", a production assistant in charge of supplying material and props as needed.

Some flexibility exists in that a tele-teacher may double as a specialist in the subject area of his competence. Theoretically, one might conclude that by now there should be 75 people split into teams of five persons each in three grades and five subjects. Actually, the 1971 budget provided for only 47 people in professional categories, plus 12 assistants whose salaries indicated a less exalted standing.

The chief explanation lies in the fact that the major effect consists of the original preparation and taping of a grade. Revisions and even complete retapings in subsequent years are far less time consuming and hence less costly. In this connection, one should mention that 1971 was the third year of television production and that personnel were fairly well seasoned. Earlier in the game, the training of new people and the correction of mistakes due to inexperience took quite a toll of man-hours.

Some idea of pace may be conveyed by the fact that a stage director, on the average, is responsible for three 20-minute programs per week. It was reported, and the taping schedule confirmed this, that the one presently available studio, during a five-day week, was working at capacity -- perhaps above it -- keeping in mind the fairly frequent electricity blackouts that raised havoc with output plans.

Work usually begins at 7 a.m. and runs, with an hour's lunch break, until 6 p.m. For each standard 20-minute show 1-1/2 hours of studio time would normally be reserved for each team. Obviously there was a high premium on detailed forward planning: the luxury of many retakes a la Hollywood was one that the system could ill afford. Lead-time of taping prior to transmission often amounted to a week or less, and a comfortable backlog of programs never existed. Under this "hand-to-mouth" regime, quality often had to suffer, and program evaluation was difficult to carry out.

In 1971, about 80 per cent of public and private junior high school classes were watching television. Even then, not every class-hour was ITV-assisted, but every session was organized around a study guide and workbook materials. Television productions for each of the three grades numbered close to 500 standard-length presentations or a theoretical total inventory of 1,500 programs. Erasures of tapes known to be substandard and scheduled for revision, however, reduced the existing shelf-stock, an economy measure designed to stretch a chronically short tape supply.

Current Costs of ITV

In many ways the operating expenses of ITV were the most closely watched cost category in El Salvador. Rarely loan-funded, the money came right out of the national Treasury. This meant recurrent cash outlays while depreciation, for some time to come merely a book entry, looked far less formidable.

The main questions under the heading of operating costs of ITV include:

- The relation of outlays to the Min/Ed's operating and total budget.
- The historical behavior of costs as the output of programs grew and as more grades were added to coverage.
- A projection of costs under various assumptions, including the important one of adopting ITV for the primary grades.
- A comparison of the costs of television with other, especially traditional delivery systems of instruction. (This topic will be covered in Part III.)
- The cost of ITV proper, if eventually facilities are shared with teacher training, adult education and cultural programs. (This joint cost problem was not evaluated in detail at this time. Hard data may not be available for analysis for a year or more in the future.)
- The cost of ITV viewed in terms of alternative use of these funds elsewhere in education.

The first topic on the list, the impact of ITV operations on the budget of the Min/Ed, can be disposed of quickly. As noted above, operating expenses of ITV between 1968, and those expected to be incurred in 1971, never amounted to more than 1.7 percent of the Ministry's current budget. This finding is encoded with a special message: if spending more money is necessary, say, for upgrading the quality of ITV programs --still a touchy subject--considerable scope exists without unduly rocking the fragile boat of educational finance.

The current-cost history of ITV, from its inception to the present, traced a path of some interest which has a definite bearing on subsequent outlay projections of a growing television establishment. Expenditures, starting from zero, were bound to rise at a phenomenal rate which, equally clearly, had to decelerate in due time. The surprise is the extent to which annual increases in expenditures actually did slow down between 1969 and 1971 (Table 2.7). The number of new programs taped and planned for taping in 1971 stabilized, even though an entire new grade--the ninth--was being taken on for coverage.

The budget for ITV in 1971 called for an increase of ₡189,000, corresponding in large part to 21 new permanent positions, all but one in the production end (Table 2.8). Part of the explanation lay in the establishment of the Properties Storage Section, allotted ₡58,000 and accounting for nine new employees. Another explanation lay in more ambitious production plans, including the start of the primary teacher

TABLE 2.7

Operating Expenditures and Output of ITV, 1966-71

Year	Operating Expenditures	Annual Increase		Permanent Personnel	Number of Approved New Programs
		Amount	Percent		
1966*	¢ 45.8M	--	--	*1/	*
1967*	141.1M	¢ 95.3M	+213%	*	*
1968*	365.1M	224.0M	+160	*	*
1969	742.8M	377.7M	+104	115	507
1970	871.0M	128.2M	+ 17	140	841
1971	1,060.0 2/	189.0M	+ 21	161	883e 3/

* Start-up years: no final program output

1/ Reportedly 3 persons.

2/ Budget Appropriation.

3/ Excludes plans for special programs that may be taped Sept. - Dec. 1971.

Source: Ministry of Education, ITV Department

TABLE 2.8

Staffing Table of ITV Department, 1969-1971

Acctg. Code	Program and Activity	1969[a]	1970	1971
019	Administration	16	18	19
-1	Office of Director	4	5	5
-2	Budget and Accounting	12	6	6
-3	General Services	-	7	8
029	Television Programming	99	122	142
-1	Production	55	49[c]	63
-2	Preparation of Audio-Visual Materials	29	36	36
-3	Evaluation	15	3[b]	3[f]
-4	Taping and Transmission	-	32[d]	31[d]
-5	Materials Center	-	-	9
	Total Permanent Staff[e]	115	138	161

[a] 74 contract employees were incorporated into the permanent staff in July 1969.

[b] 12 people working on the utilization of ITV programs were transferred to the Junior High School program.

[c] The production section was split into activities (1) and (4).

[d] Some personnel worked on half-time basis.

[e] Excludes temporary personnel and those working on a day-to-day basis (also foreign technicians not on Min/Ed payroll.)

[f] Actually there were nine people working on evaluation but only three were on budget of ITV Department.

Source: Ministry of Education, ITV Department.

retraining project and, for the first time, some programming for general educational television. The number of regular ITV tapings--both for the new ninth grade and revisions of earlier grades--scheduled until the end of September 1971, plus special programs completed by that date, actually exceeded what had been accomplished during the same period of 1970.

The major output unit of ITV in El Salvador, as may be evident by now, is the standard 20-minute program, inclusive of related teachers' guides and student workbooks. It was neither desirable nor practical to divide this package into its components, particularly at this early stage of ITV operations. Other activities, such as the organization of seminars, were minor in expense.

Projection of ITV Operating Costs

The budget figure for ITV operations in 1971 has another useful property. It may be considered, in preliminary fashion, a normative model for the cost of a typical three-grade cycle of instruction. Actually program production that year worked out to include three components: the addition of one entirely new series--the ninth grade; a 50 percent revision of the eighth-grade programs; and a 20 percent revision of the seventh-grade programs originated two years earlier. In other words, the expenditure level of 1971 paid for the coverage of three grades, assuming a program life of three years. At the same time, it permitted 50 percent and 20 percent program revisions in the second and third years of use, prior to complete retaping in the fourth year.

To argue that the bill for three such cycles of education would be as much as three times that of the 1971 operation would be taking a rather extreme position, surely an outer limit. For one, the administrative staff would neither triple nor even double in size, nor in cost, as the system expanded to take in nine grades. Proof lies in the fact that the management group put only three new people on its payroll of 16 between 1969 and 1971, while the output of programs very nearly doubled during that same period. (Table 2.8).

The production side also is certain to contain cost elements that behave like overhead, or at least like semi-fixed costs--rather than rise proportionately with expansion to scale they would show relative constancy. As a case in point, the new materials center comes to mind.

Further, instruction at the junior high school level is more sophisticated and, due to a heavier mixture of natural sciences, is more costly to produce than would be the creation of primary school programs. While this is not entirely certain, if true it would mitigate against a multiplier of costs proportional to the number of grades.

On the other hand, to think that a set of nine grades will cost no more than twice as much as a three-grade cycle is a bit optimistic. Splitting the difference we arrive at a multiplication factor of 2-1/2 times for an estimate of what it would cost fully to cover three cycles of "basic education." The product of this calculation would mean a budget of roughly ₡2.5 million, still only three percent of the 1971 operating expenses of the Min/Ed.

Once more in this estimate we are implicitly holding quality and production techniques at the 1971 level, although the former is likely to improve simply with time and experience, without much more in the way of new expenditure than some pay raises due to an upgrading of jobs and the incidence of seniority. The move of the ITV operation to its new and far more ample location in Santa Tecla should lower rather than raise expenses due to greater efficiency of layout and the substitution of direct-hire personnel for what amounts to contracting for commercial channel employees.

A decision over whether or not to expand ITV to grade-school, a far more challenging undertaking than junior high school broadcasting in terms of sheer organization and wide-ranging social implications, has been postponed for the time being. For reasons alluded to but more fully explained below, television is not universally accepted. The lack of receiving equipment in the rural areas is certainly an obstacle. The present Administration of El Salvador, feeling perhaps that it has done more than its allotted share of reforming education, would just as well leave this controversial issue to its successor.

This raises policy and cost problems for ITV of a different nature. Capacity is in place and waiting. Not to use it fully would be wasteful. The direction in which the Ministry is presently looking is, first of all, the training of primary teachers in the use of reformed materials and methods and, in second place, educational television in the broadest sense, from public health to literacy for adults. The discussion will return to these topics in some detail later on.

In trying to assess the costs of such new uses of television facilities, the only available yardstick--but an eminently practical one--is the record of ITV operations to date. Transmission we know is not a major cost item, while programming most certainly is. Costs, therefore, hinge importantly on the extent and type of program production. An hour of guitar playing, and even a rock-and-roll concert, would be extremely cheap ways of filling up the station schedule. Cultural films might be obtained for the price of two-way postage from international organizations. On the other hand, gearing up for the much-heralded, continuing teacher retraining operation at the the primary level, the normal permanente, may be as expensive (or more so if done right) as putting ninth-grade science on the screen.

What one can say at this point, with some confidence, is that with an operating budget of about ₵1 million the system as it stands has a "rated" capacity of turning out one thousand 20-minute programs of reasonable quality if the average cost can be held to roughly ₵1,000 per hour and if the content lies in the general area of formal instruction. The ITV budget for 1972 naturally must give first priority to revisions of the three grades now being reached and translate this objective into the corresponding number of standard-length tapings. The difference between this specific number or about 500 tapings--an educated guess based on past revision rates plus tapings missed in 1971 because of work stoppages--and the above-mentioned 1,000 program capacity represents an "open-to-produce" position.

The primary teacher retraining program would occupy perhaps three full hours on 36 Saturdays, requiring five standard programs each. At ₵1,000 per program--the need for no more than a combined guide-workbook would reduce costs somewhat--this works out to the equivalent of 180 standard programs, at an operating cost of roughly ₵180,000. Quick reckoning indicates an untapped remainder of in-house capacity of 320 standard programs, available for rural education.

In filling this gap, the real question is whether the existing staff is flexible enough to shift into other than formal school broadcasting; whether some subject area specialists and tele-teachers will be sent back to their regular classrooms, at least temporarily; and whether the above group will be kept on the payroll intact to produce fewer programs, hopefully of correspondingly better quality. The last option would, of course, raise program costs but, more importantly for the situation at hand, would require the hiring of additional specialists in the various fields of vocational and general education that the ITV Department is mulling over. However, the plan is to borrow such people from other Ministries like Agriculture and Public Health "free of charge".

Having mentioned all the key elements in the budgeting equation for 1972, it is only a matter of determining the volume and mix of both program types and producing staff in order to estimate how much money the television people should request. The possibilities, within plausible ranges of budget allocations, are considerable.

Unit Operating Co[illegible] of ITV: Principles

Many people, when asking what instructional television really costs, have already formed an answer in their minds. Secretly they expect to hear some rather astronomical figure, at which to express the proper astonishment, and subsequently to dismiss ITV as a luxury far too expensive for their modest means.

From a planning standpoint such cost information for one medium is quite meaningless by itself, except for one limiting case. Where financial resources are too deficient to consider an investment proposition, costs might as well be infinite.

Normally, cost must be referred to two yardsticks: the utility or profit to be gained by incurring it; and second, the cost of alternative avenues to reach the same goal. Ultimately one seeks the best relationship between costs and benefits, whose prototype in business is known as the rate of return on investment.

Certain simple cost figures, such as overtime, serve a purpose when used as an index for budget control, because, as long as production does not suffer, costs are to be minimized, and the behavior of expenses furnishes tell-tale clues about good management. That characteristic of costs comes up at times in this report.

Benefits are points of reference to be covered in later sections. As for the other bench-mark, existing alternatives, there is really only one type of cost worth talking about in an analysis of ITV--assuming money for education is available--and that is comparative cost.

Necessarily this means cost per unit of "instructional input" or package of inputs when employing this particular technique. Once such a unit cost has been determined, it is then easily set against the corresponding cost of an alternative medium, always under the constraint, to simplify the discussion, that learning results are equivalent. Learning, after all, is the ultimate output of an educational system, no matter whether it employs teachers, computers, books, audio-visual materials, radio, group study or whatever. The student himself also is, to the system, an input--the "raw material" on which education goes to work.

The selection of a particular unit as the most suitable input base is open. In ITV, the major possibilities include cost per program, per grade, per class or per student, always specifying whether the time factor involved is an hour, a week, a month, a year--or even a lifetime.

The first unit to which television costs will be referred here is the program, the studio's main output. Typical of multi-stage production processes, programs are intermediate outputs to be converted into inputs farther "down-stream" at the final locale of information delivery: the schoolroom. At that point, in enough situations to make it interesting, an hour of television is an alternative to a teacher-contact hour, or an hour's time on a computer, or an hour of independent study, given the number of students who are listening or attending. Such cost comparisons among media are reserved for Part III, which deals with efficiency improvements in the system.

The Behaviour of Program Costs

The first unit cost--operating outlay per program, exclusive of capital costs--was simply derived by dividing the ITV operating budget by the number of approved tapings, with a surcharge for tape usage. Program costs are important to the producer as a measure of something like "studio efficiency." This concept differs from user cost, discussed later, which must take account of the "shelf-life" or longevity of a given lesson.

Tape costs, being grant-funded for the most part, have largely remained outside the operating budget but should be included in normal operating costs. Also, grant money to buy tape has run out. In these calculations, any footage produced but ending up "on the cutting room floor"--"the out-takes"--did not enter the count as product although, as a waste of materials, they figured as part of the cost.

An average cost per program transmission is also conceivable. In the light of more useful unit measures that cover similar ground, we discarded this possibility. The cost of putting videotape on the air was relatively minor and is included above.

As it happened, the average cost per program taped, according to simple budget figures, dropped from ₡1,460 in 1969 to ₡1,040 in 1970, a decrease of close to one-third (Table 2.9). Usage of videotape is not included here as yet. This reduction of unit costs was a classical case of spreading fixed overhead over a larger volume of production. Operating outlays rose less than 12 percent, while approved tapings increased as much as 65 percent. If the teachers' strike had not intervened, gravely interrupting work schedules, operating costs per program taped would quite likely have decreased even further in 1971 (but this must remain a speculation).

Today, the production pattern, and hence the cost structure of ITV in El Salvador, have far from stabilized in any definite way to permit standard costing as understood by the accounting profession. Still, subject to numerous qualifications, operations have sufficiently settled down to permit stating that the average production cost per program is about ₡1,000 for 20 minutes viewing time, or ₡3,000 per hour if we decline to make adjustments for recess and a 50-minute teaching hour (Table 2.10). It is also said that producing a full one-hour program in sequence costs less than three 20-minute programs separately. The purchase of tape, priced at about ₡420 per 66-minute reel, or roughly ₡140 per 20 minutes often presented problems to the Min/Ed, but the cost per program over an average five-year life proved negligible. The current production cost of one program-hour will serve as a yardstick later on.

This program cost, it may be recalled, is that of a package because, as in virtually any ITV system known or imaginable, it includes a teacher's guide and a student workbook. Also, the cost estimate is on the high side, an advantage in aiming at conservative comparisons with other media:

TABLE 2.9

DETAILS OF ITV OUTPUT CHARACTERISTICS, 1969-72

	1969	1970	1971	1972e
A. Program Production				
(1) Total Taping	507	841	883	-
(2) Regular ITV Programs	498	831	806	800e 1/
(3) Special Programs	9	10	77 2/	-
B. Costs of ITV Operations				
(4) Budget Outlays	¢ 743M	¢ 871M	¢1,060Me	¢1,100Me
(5) Ave. Production Outlay per Program 3/ (4) ÷ (1)	¢1,460	¢1,040	-	-
C. Allocation of Outlays to Regular Programs:				
(6) Percentage of Total	98%	99%	91%	90%e
(7) Amounts of Allocated (4)4/ x (6)	¢ 730M	¢ 860M	¢ 970M	¢ 999Me
D. Students in Teleclasses				
(8) Plan Basico	2,000	10,000	25,000 5/	40,000e
E. Operating Cost of ITV per Student				
(9) Item (7) ÷ (8)	¢ 365	¢ 86	¢ 39	¢ 25
F. Memo: Transmission Data:				
(10) Totals	511	845	1,704	-
(11) Regular Programs	499	835	1,602	-
(12) Special Programs	13	10	102 6/	-

e - Estimates

1/ These tapings would all be revisions of Grades 7-9.

2/ Taped as of August 1971 when a strike interrupted production.

3/ Exclusive of ¢140 for usage of tape.

4/ Proportion of regular to total programs; figure for 1971, based on incomplete data and probably too high.

5/ Best estimate: figure may be a shade low.

6/ Transmitted as of August 1971.

Source: Ministry of Education, ITV Department

TABLE 2.10

AVERAGE CURRENT PROGRAM PRODUCTION COSTS OF ITV
EL SALVADOR 1970 1/
(In millions of colones)

Item	Amount
A. Standard Basis: 20 Minute Program	1970
(1) Operating Expenditures for ITV Department	¢ 871M
(2) Program Output (Approved Number of Tapings) 2/	841
(3) Ave. Production Cost per Program: (1) : (2)	¢1,030
(4) Ave. Production Cost per Program, incl. Revisions during 3-Year Life: (3) x 1.70 3/	¢1,760
(5) Ave. Annual Production Cost of 3-Year Program (4) : 3	¢ 587
(6) Annual Cost of Usage of Magnetic Tape 4/	28
(7) Ave. Annual Cost of 3-Year Program, incl. Tape	¢ 615
B. 60 Minute Program Basis	
(8) Ave. Program Cost Per Hour: (3) x 3	¢3,090
(9) Ave. Program Production Cost Per Hour, incl. Revisions during 3-Year Life: (4) x 3	¢5,280
(10) Ave. 3-Year Program Cost Per Hour, incl. Tape (7) ÷ 3	¢1,845

1/ Excludes capital depreciation. Includes preparation of guides and workbooks but not printing and distribution.

2/ Includes 10 special programs not for junior high school level.

3/ Based on 50 percent revision in second year and 20 percent in third year.

4/ Based on tape cost of ¢140 per program and 5-year tape life, during which no more than 6-10 passes are likely to occur.

Source: Ministry of Education, ITV Department

production is only in its third year and, beyond normal turnover, new people still have to be trained creating a drain on the time and efficiency of existing staff. Some ancillary activities take place at San Andrés, like seminars, but the costs are minor.

Normal Program Costs

For analytic purposes, in several later sections, this study will use a current program cost of ₡1.000 for initial production as a reasonable approach to a norm. This takes into account the given facilities at San Andrés, present quality of the standard "media package", and a rated capacity of about 1,000 programs per year. The figure is meant to make allowance for the cost of tape and is based on a mix of about 60 percent of new programming and 40 percent of the cheaper program revisions. It is too early to say what level the operating costs in the new facilities at Santa Tecla will reach but, as explained below, they should be lower, even at the same volume of tapings.

An important cost element not yet touched upon, is the "shelf-life" of a given program series. One may suppose that a new program calls for annual revisions until patching up is no longer feasible and the entire series needs redoing. A tougher stance is to declare summarily that a program, regardless of quality, becomes outdated within an average of three years and must then be retaped. Still another pattern, particularly in countries just starting out on the road to modern media and well-grounded in Salvadoran experience, is extensive revision in the second year of screening--perhaps 50 percent and more--tapering off sharply thereafter.

Accordingly, the life of the average program was factored into costs, judged conservatively to last three years. A closely related cost element were revisions, estimated to cover perhaps 70 percent of original program content. The net outcome of both adjustments was an average cost figure of ₡615 per program and ₡1,845 per program-hour during a three-year life (Table 2.10).

Parenthetically, tape cost per program rises with the latter's longevity. The reason is that a program utilized for one year releases the tape for erasure and rerecording after about one-fifth of its physical life, whereas a three-year program will tie up the same tape correspondingly longer.

In El Salvador, the need for radical program revision was undoubtedly a function of the shortage of space and the pressure of time, as commented upon earlier. This has an important bearing on the strategic and ticklish production staff to consider. One seems justified in believing that the amount of revision required is closely linked to quality of production in the first place. A direct trade-off most likely exists between (a) the level of staff salaries and the number of hours spent on program planning, with all its myriad alternatives, and (b) the extent of later remakes of various sequences. If such a relationship exists, then an appreciable stepping up of program quality could turn out to be relatively costless because of an equal reduction in revision expense.

A simple example may clarify and quantify this point. If a given program has a two-year life span before becoming obsolete and, under certain standards of production, requires a 50 percent revision in its second year, it would probably pay to spend half again as much on original programming if this were to eliminate revisions. Of course, there is an intermediate range of tradeoffs.

Whether this hypothesis, logical enough on paper, would work out in practice is a different matter. At least in El Salvador the amount of revision has been a direct function of hasty production to meet transmission deadlines. But it can easily be imagined that this policy, by offering first-rate broadcasting right from the beginning, would almost certainly yield a larger quantum of learning, and this at no increase in cost over the program's lifetime. It is a principle worth considering.

There is another question which this report should not sidestep, and that is how precisely the activities of the 161 people in the ITV Department contribute to the cost and effectiveness of programming. An organization-and-methods study on television production may soon become worthwhile. Program costs are a direct function of how interlocking activities are planned, how people are organized, and how schedules are executed. Overstaffing is expensive. However, after only three years of operations and a major physical move to new facilities in immediate prospect, let alone the changeover to new equipment to be acquired under Loan 013, it is probably premature to probe too deeply in this direction. An awareness of the problem nevertheless is in order.

Capital Costs of ITV

The investment aspect of a television operation looms large in the public mind and does so in El Salvador where ITV is going through two distinct stages of capital costs. The initial stage, beginning in 1968 and expected to last until the end of 1971, involved only a minimum installation housed in two buildings in San Andrés. Also, a workshop was transformed to serve as a makeshift studio. Equipment and building costs, therefore, stayed at rock-bottom levels (Table 2.11). The annual depreciation expense, based on a ten-year life of the major hardware items, came to ₡82,000 or a "surcharge" of 8 percent on top of the 1971 ITV operating budget.

It bears mention that the initial hardware, which was grant-funded, never appeared on the Salvadoran books. As in many educational establishments elsewhere, they were innocent of depreciation accounting. Further, the current budget of ITV even now contains a hidden capital cost, the rental of commercial Channels 2 and 4 during certain morning and afternoon hours of the school-year. These payments, contracted for ten months, amounted to ₡40,000 for one channel in 1969, to ₡55,000 in 1970, and to ₡110,000 for two channels in 1971. As soon as the new AID Loan 013 financed equipment becomes operational, as noted below, these expenses will "disappear", to be replaced in part by depreciation and in part by the hiring of in-house technicians. Even so, local engineers report that they expect a cash saving to be realized in the switch-over.

The second, expanded phase of operations is about to commence in the almost completed three-studio complex in Santa Tecla, which will utilize the donated equipment in San Andrés plus the new equipment just mentioned. When fully functioning with its own two channels and two repeater stations to cover the country's "blind spots", El Salvador's ITV will have a powerful broadcasting capacity usable not only during school hours but also during the

TABLE 2.11

CAPITAL COSTS OF ITV PRODUCTION IN EL SALVADOR: STAGES I and II

Item	Cost	Life	Annual Depreciation
A. Stage I: San Andres 1/			
(1) Grant funded Equipment (Excl. TV Receivers)	₡ 820M	10 yrs.	₡ 82M
B. Stage II: Santa Tecla			
(2) Loan 013 Equipment (Excl. TV Receivers)	₡3,750M	10 yrs.	₡ 375M
(3) Air Conditioning (GOES-Funded)	₡ 190M	10 yrs.	₡ 19M
(4) Studio Building (GOES-Funded)	₡ 877M	20 yrs.	₡ 44M
(5) Total Capital Investment	₡5,580M		
(6) Total Annual Depreciation Expense: (1)+(2)+(3)+(4)			₡ 520M

1/ Remodelling of San Andrés buildings as temporary quarters is considered a start-up expense.

Sources: Min/Ed., ITV Department; AID/ES, Controller's Office and Edcuation Division.

prime evening hours on weekends and on holidays. A third channel could be added, we are informed, at a cost of only ₡125,000, thereby further expanding the scope of the station by one-half.

At this stage, depreciation will take on a more weighty aspect. Based on an investment of ₡4.6 million in transmission hardware, again judged to have a life of ten years under proper maintenance by the above-noted technical personnel and on a largely air-conditioned studio building worth ₡1.1 million with a life of 20 years, the annual expense for depreciation will rise to ₡520,000. This is half again as much as the current level of ITV operating expenditures. It may be considered a fairly "hard" figure: stretching the expected life of the studio building from 20 years to 40 years would have little impact.

Interest changes are not included here for reasons set out in Appendix III.

The Cost of Television Receivers

The receiving phase of a television system as well as the transmission side can be examined in several ways. The total investment in receivers in place is still small, grant-funded at ₡138,000, but under AID Loans 013 and 014 this sum will expand to almost ₡700,000. (Table 2.12). The 22-inch and 23 inch Sylvania sets have an estimated life of five years--experience with them has been very good and breakdowns have been a rarity--which would mean a total annual depreciation charge of about ₡140,000. At a cost per set of ₡500, fully equipped with antenna, the ITV project counts on the acquisition of 1,380 receivers, of which 275 have so far been installed in schools.

TABLE 2.12

COST OF TELEVISION RECEIVERS

	Number	Cost	Annual Depreciation
A. Receivers Shipped			
(1) AID Grant, Shipment No. 1	75	₵ 38M	₵ 7M
(2) AID Grant, Shipment No. 2	200	100M	20M
Subtotal	275	₵138M	₵ 27M
B. Receivers Expected			
(3) Loan 013	500	₵250M	₵ 50M
(4) Loan 014: Plan Basico	510	258M	52M
(5) Loan 014: Primaria	100	50M	10M
Subtotal	1,110	₵558M	₵112M
C. Total Receivers Shipped or Expected	1,385	₵696M	₵139M

Source: AID/ES, Education Division

A different issue is raised by the investment that might be required to extend ITV to the primary level, with its roughly 12,000 school-rooms throughout the country. It stands to reason that the Min/Ed will hardly be able to provide anywhere near that many receivers in one fell swoop: the required investment could run up to ₡6 million. Credit terms, if available, might be less than generous in length of repayment period in view of the relatively short life of a set. More likely is that El Salvador will embark on a step-by-step acquisition program of receivers as the need arises from other quarters. The success of several ITV programs now in the planning stage will depend directly on the number of sets provided, as discussed in later sections.

The investment in reception equipment, however, has a unique aspect, one that is lacking in the purchase of transmission hardware. Receivers are dispersed over hundreds of localities. Just as the aggregate outlay for the Min/Ed would be sizeable, it would be modest and affordable for a single community. Considering an annual depreciation cost of ₡100 per television set, or about ₡10 per month, this may not be prohibitive burden in a great many places.

There is one other consideration to be mentioned. Tax collection in El Salvador is generally thought to be open to some rather wide improvement. Also, unlike many other countries in Latin America, El Salvador does not oblige large landowners and business firms to educate the children of their employees at their own expense. It would appear to the outsider that the local level has some unused capacity that could be tapped to make some contribution to the public welfare.

As a practical matter, the money to buy television receivers could be raised immediately through a foreign loan, or even a domestic credit scheme, back-to-back with a plan to amortize the investment through the equivalent of local taxes. The approximate 1,000 sets needed to put the Primary Teacher Training Program, discussed later, into full operation could be financed for ₡500,000 at the most.

Start-Up Costs

The success of an enterprise is usually accompanied by several "loss-years" before the income statement moves into the black. These early losses are the result of start-up costs, development expenses that are recovered only gradually over the years. Unlike normal operating costs, or outlays for equipment depreciated at regular rates, start-up expenses are a special type of capital cost--one-time and non-recurrent in nature.

Applying these accounting definitions to ITV in El Salvador, the first start-up expense that catches the eye is the operating budget, inclusive of a special remodelling expense, of the early years of the Department's existence between 1966 and 1968, amounting to ₡658,000. (Table 2.13). Apart from some tryouts over closed-circuit television, there was no output of programs. All the work was purely developmental in character. A second start-up expense of ₡106,000, paid for by Salvadorans out of their own pockets, was the remodelling of San Andrés. The converted studio will revert to its former use in late 1971 when the Santa Tecla station begins to function.

A third, and rather staggering cost of starting television was the bill for technicians and advisors. The larger part of this bill, ₡2.0 million, was

TABLE 2.13

NON-RECURRENT OR START-UP COSTS OF ITV IN EL SALVADOR

Item	Amount
A. Expenses Borne by GOES	
(1) Operating Budget for ITV, 1966-68	¢ 552M
(2) Remodelling of Buildings, San Andres	106M
Subtotal: (1) + (2)	¢ 658M
(3) Technical Assistance, Loan 013 1/	¢ 122M
(4) Technical Assistance, Loan 014 1/	375M
Subtotal: (3) + (4)	¢ 497M
Subtotal: (1) through (4)	¢1,155M
B. Expenses Borne by U.S. 2/	
(5) Technical Assistance, Direct AID	¢ 290M
(6) Technical Assistance, Contract 3/	1,508M
(7) Local Personnel, Direct AID	98M
(8) Participant Training	20M
(9) Other Costs, Direct AID	63M
(10) Contracts	15M
Subtotal: (5) through (10)	¢1,994M
(11) Estimate for (5) through (10), FY 1972-73	750M
Subtotal: (5) through (11)	¢2,744M
C. Total Start-Up Costs, (1) through (11)	¢3,899M

1/ Planned for 1971-73

2/ AID Accounting Code 071.2: Educational Development (FY 1968-1971 only).

3/ Partly grant-funded and partly financed AID/W.

Sources: Min/ED, ITV Department; AID/ES, Controller's Office and Education Division.

met by AID/ES and AID/W, through direct hire and similar payments, or through grant funds. For FY 1972-3, these expenses may be estimated at ₵750,000, bringing the total since 1968 to about ₵2.8 million. The accounting view taken here is conservative; comments in the later section on the cost of Reform without ITV regarding the treatment of technical assistance apply here as well.

Another part of technical assistance and allied costs amounting to ₵497,000 will be paid for by Salvadorans themselves out of AID loans 013 and 014, assuming present plans for the years 1971 to 1973 materialize.

This is not all, however, if one looks at the ITV operation as a business proposition. There were, in addition, pre-planning trips to El Salvador by teams of experts from AID/W; a consultant report by the National Association of Educational Broadcasters; a study by the World Bank; and one by Pennsylvania State University. On the Salvadoran side, there was a group of Japanese looking into the feasibility of ITV. CONESCAL repeatedly sent advisors on school layout and construction from Mexico. One might also ask about the "policy" overhead in Washington and in San Salvador from the first beginnings of the project up to the present time: these are not included as yet in start-up costs. At about ₵75,000 per man-year for foreign advisors, another ₵1 million is easily squeezed out of these last items.

The difficulties of how to deal with these non-recurrent development expenses, which of course should be capitalized as assets, are many. The Accounting Principles Board in the United States recently tried to impose a

40-year obligatory write-off for this general type of investment outlay, a rule rebuffed by large corporations as arbitrary. On the other hand, start-up expenses are part of the original capital cost of ITV and one could argue that they should be charged off over a reasonable period of time. If so, a 40-year amortization would add no more than about ₡100,000 to annual costs, a nominal amount (Table 2.13).

To the extent that El Salvador is serving as a successful pilot operation and model for instructional television on a world-wide basis, which will hopefully lead to adoption elsewhere, there is the further question of whether her non-recurring development costs should not be partly charged against future ventures. Industry follows this kind of practice. But again, the results are rendered more conservative if one lets start-up costs remain, undiluted, as a charge against the Salvadoran enterprise.

Costs of Educational Reform Other Than ITV

The question of what educational reform has cost El Salvador, without considering television, is simple to answer in accounting terms and difficult in concept. We have already argued the fruitlessness of separating the two functionally, and may hence proceed with a ledger review of the major planks of the reform one by one.

At this point we need a criterion that would distinguish between routine Min/Ed operations, which normally proceed with "deliberate speed," and activities that are expanding and plainly innovative. Minister Beneke's Annual Reports to the Legislature and documents dealing with the Reforma Educativa issued by CONAPLAN, the national planning office, are a fairly reliable guide in knowing where to look and what to look for. The constraints of this study make the job easier yet. Low-cost programs, unless they have an impact on the budget elsewhere, can be treated briefly.

In broad strokes, the story of reform costs, exclusive of ITV, is simple. Apart from foreign-financed school construction programs--whose inclusion among reform activities is by no means a clear-cut issue--the cost impact of various system changes has been minuscule in the overall budget pattern and is likely to remain so in the next few years (Table 2.14).

Operating Expenses

Taking the operating budget first, the largest of the non-ITV costs of Reform turned out to be teacher retraining. The institution charged with this task, Ciudad Normal in San Andrés, about an hour's ride from San Salvador, was virtually ready to be closed down after 1968 because of the surplus of primary teachers. It took a new lease on life in 1969. The immediate cause was the shortage of qualified instructors at the secondary level to staff the new television classes.

In 1970, all of the work done at San Andrés could be charged to one reform project or another, and in 1971 only a small part of its budget was devoted to routine activities. On the whole, the expense of training teachers and administrative personnel to implement reform has come close to ₡5 million to date and will continue to run along at a moderate clip.

TABLE 2.14

Total Cost of Educational Reforms, Exclusive of ITV
1966-1973
(In millions of colones)

Item	Totals	1966-1967	1968	1969	1970	1971	1972-1973 1/
MAJOR CATEGORIES							
A. Operating Costs							
Teacher Retraining	6.7	-	-	1.6	2.1	1.0	2.0
Supervision	1.5	-	-	0.1	0.1	0.4	0.9
Reprinting of Recap Texts	0.6	-	-	-	-	0.1	0.5
Subtotal	8.8	-	-	1.7	2.2	1.5	3.4
B. Investment Costs							
Construction, Diversified High Schools	19.6	-	-	-	1.2	10.3	8.1
School Construction, AID Loan 014 2/	19.3	-	-	-	-	-	19.3
C. A. Technological Institute	0.8	-	0.4	0.1	-	0.3	-
Sports and Recreation Facilities	1.2	-	0.1	-	0.2	0.9	-
Project Planning and Supervision (COPLACE)	2.9	-	0.1	-	0.3	1.0	1.5
Subtotal	43.8	-	0.6	0.1	1.7	12.5	28.9
C. Non-Recurrent Start-Up Costs							
Non-ITV, Technical Assistance for Reform	0.9	-	-	-	-	0.4	0.5
D. Total GOES Costs	53.5	-	0.6	1.8	3.9	14.4	32.8
E. Foreign Grants							
Non-ITV, Technical Assistance for Reform	2.9	0.6	0.3	0.3	0.3	0.5	0.9
F. Total Costs, Reform without ITV	56.4 3/	0.6	0.9	2.1	4.2	14.9	33.7

1/ Estimated

2/ Technical assistance component included in (C) below.

3/ Excludes inputed cost of community-built schools of ₡10.6 million.

Sources: Ministry of Education: AID/ES, Controller's Office:
UNESCO mission, El Salvador.

(Table 2.15). Teachers' salaries paid while in training are included in costs because substitutes had to be hired to take over their classrooms. In 1971, the teachers' strike disrupted the schedule at San Andres severely and our best estimate was that an amount about equal to the budget assigned to that institution would be spent. Primary teacher retraining, as will be discussed later, will be undertaken through the use of ITV rather than the usual techniques.

A second operating cost is that of the Supervision Program. The function itself, in existence and dispersed in the Min/Ed for a long time, was centralized with the onset of reform in 1968. Successive reorganizations and structural changes made it laborious to trace detail, but their net effect was to raise the number of positions from 180 to 244 between 1967 and 1971, not including a fluctuating number of grade-school directors--45 in 1971--who received extra compensation for acting as part-time supervisors. The additional cost by 1971 may be estimated at ₡450,000 annually. The total budget for this particular subprogram has gradually risen to ₡1.2 million.

On the organization chart, the supervisory function is a key to the smooth working of schools because, potentially, it controls the inputs and quality of the system. A main thrust of the reform, which is still in process of formulation and at present more hope than reality, is the Ministry's goal of changing the role of the supervisor from that of a disciplinarian and work auditor to that of collaborator and provider of technical services. The substance of this aspect, however, is more properly the province of professionals in the field.

A fairly large reform expense in store for El Salvador's budget is loan-funded technical assistance. Something like ₡75,000 under AID Loan 013 and another ₡600,000 under AID Loan 014 have been set aside for this

TABLE 2.15

Major Operating and Start-up Costs of Educational Reform Other Than ITV 1/

Program	Dates	Amounts (In thousands of Colones)
A. Costs Covered by Min/Ed Budget 2/		
(1) Training of Teachers and Other Personnel	1969-71 3/	₡4,700
(2) Expansion of Supervisory Function	1968-71	650
*(3) Technical Assistance, AID Loans 013 and 014	1971-74	670
*(4) Technical Assistance, World Bank Loan	1971	370
(5) Reprinting of ROCAP Textbooks	1071-73	560
Subtotal, GOES Costs		₡6,950
B. Costs Covered by Foreign Grants		
*(6) Technical Assistance, U.S. Grants	FY 1968-74	₡1,110
*(7) Technical Assistance, UNESCO	1967-71	670
*(8) Technical Assistance, United Kingdom	1965-71	550
Subtotal, Foreign Grants		₡2,330
C. Total, GOES Costs and Grants		₡9,280

1/ Figures for 1971 partly estimated, and for 1972-74, where given, based on existing forward plans.

2/ Technically the repayment of loans is covered by the budget of the Treasury.

3/ Includes administrators and supervisors. For 1971, cost was estimated at 90 percent of projected budget. Three months of training for *Plan Basico* teachers in 1968 not included.

* Considered to be start-up costs. NOTE: Excludes costs for technical assistance by CONESCAL, largely U.N.-funded, and of Japan. This total possibly amounted to as much as ₡400,000.

Sources: Ministry of Education; AID/ES; UNESCO Office, San Salvador; C.A. Technological Institute, San Salvador.

purpose for FY 1972-74. The types of assistance run the gamut of educational specialties, from librarian to student counseling.

On the other hand, a substantial amount of technical assistance was grant-funded to help the educational reform get started, a program cost but not an expense to El Salvador. In FY 1968-70 about ₡460,000 was spent from grant sources, mainly on personnel but also on commodities, with another ₡650,000 scheduled for the years 1972 to 1974.

This may be as good a place as any to comment on the accounting separation between the programs called "Educational Plan and Normal School Development" and "Instructional Television." The distinction--clear on the books of AID/ES--in practice got blurred, and as it became more and more a fiction, the two respective accounting codes were merged into one in FY 1971. Despite conscientious efforts to identify ITV costs and keep them uncontaminated from other operations, full success cannot be guaranteed.

A good deal of technical assistance was also provided to El Salvador, free of charge, by the United Nations. Consultants working out of UNESCO's office represented a cost of at least ₡670,000, exclusive of secretarial staff and general overhead. The chief of mission functioned as a key advisor to the Minister.

The World Bank, as part of its diversified high-school construction program, provided five consultants whose cost came to about ₡370,000 in 1971.

This review would be incomplete without inserting the United Kingdom's contribution of ₡550,000 in faculty support and scholarships for the Central American Technological Institute, although that project had its inception as early as 1965. It is now firmly incorporated into the panoply of reform.

One would think of a better supply of books as a staple item, standing high on the agenda of any educational renovation. Apart from the workbooks produced by the ITV Department for grades 7-9, however, this has not yet occurred on a great enough scale in El Salvador. AID/ES has been participating for years in two regional book programs, ROCAP covering Central America, and RTAC translating books and lending films from Mexico, but neither one can be said to have ridden high on the wave of reform. Hence these programs were excluded. Still, the Min/Ed has recently decided to put some of its own money into the reprinting of ROCAP texts, a "first" that should be chalked up to reform. About ₡60,000 has been allocated for 1971 and another ₡500,000 is in prospect for the next two years.

Among the relatively inexpensive but strategic programs of the reform is curriculum change. This was accomplished for the first nine grades, but most fully for the old Plan Basico the entering wedge of Reform/ITV. Complete revision is also being contemplated for the senior-high-school grades 10-12 which are to lead to diversified careers, academic and otherwise.

The rather thorough recasting of curricula along modern lines ran the gamut from educational objectives to guidelines for testing and evaluation. All of these activities were being carried out, except for the very last phase, by the Department of Technical-Pedagogic Services. On the other hand, the more detailed job of writing student workbooks and teacher's guides was under the jurisdiction of the ITV Department, as discussed earlier in this report. The several curricula, embodied in nine attractive booklets, specify detailed study content as well as classroom and informal outside projects, week by week and subject by subject, for the entire school year.

On the matter of costs, one would expect such a thorough-going revamping of old study plans to require a rather strong injection of funds. Surprisingly, this was far from the case. Apart from outside technical assistance, the substantive task was accomplished by a group of five Salvadorans. The senior-high-school level will similarly require only modest inputs.

From 1968 to 1971, the budget of the entire Department responsible for the work fluctuated between no more than ₡107,000 and ₡140,000, of which only between ₡20,000 and ₡30,000 may be directly assigned to curriculum revision. The rest of the money went for in-house technical support that covered audio-visual materials and special in-service training courses for primary teachers throughout the country. It also paid, since 1969, for the services of a Ministry-wide Statistical Section.

An important phase of reform, on which the Minister has staked high hopes, is the diversified high school program. A considerable amount of investment money has been set aside and, as noted below, implementation of the program is awaiting completion of physical facilities. So far, senior-high-school studies as a whole have not yet experienced either the program changes that are in store for them or any great surge in current costs.

Sprinkled through the operating budget, and changing in complexion and structure from year to year, are many other programs, some entirely due to and others affected in part by reform. From a systems point of view, physical training, sports, faculty and welfare projects, cultural enterprises, numerous and continuing reorganizations--all are highly significant to reform as a whole. Many other programs of this sort dot the landscape. Yet, financially speaking, all this is frosting on the cake, explaining the cavalier treatment given them here. In no way does this reflect on their merits.

One would think that a reform-induced acceleration in the growth of the student body should be counted as a relevant cost, and so it is. But to separate it out or to predict its future rhythm is virtually impossible. Continuity with the past has been broken and new forces are at work. This subject will be discussed fully and in much broader terms under the subject of covering the scholastic deficit, a target of reform costed out for its above-baseline impact on the budget.

Again, no provision will be found in this section for debt service of any kind. The subject is discussed in Appendix III.

A parting comment on the current costs of reform, with or without ITV, is in order: they were easily absorbed within the operating budget in the year 1968-70, causing hardly a ripple in its steady movement upward. The first time that the momentum of reform took strong hold financially was in 1971, traceable in part to the sharp enrollment surge in the third-cycle grades, an event not unrelated to the assumption of certain expenses previously met by local parent associations.

Some Dilemmas of Procedure

Before concluding this section, explicit attention should be drawn to some moot issues, resolved here on a "best-effort" basis. The inclusion of teacher retraining in reform costs is open to some dispute: until a recent surplus developed, the expense of teacher training existed partly within the budget and was partly met by would-be teachers themselves in tuition payments to private normal schools. Some retraining, it may be contended, has simply replaced normal training outlays.

The defense against this argument lies in looking at retraining in the light of actual alternatives. If there had been no reform and no planned expansion of junior-high-school enrollment, no retraining effort would have been needed. This report adopted an "opportunity cost" approach in charging reform with teacher training.

Teacher retraining was not specifically allocated to the ITV program because it was not contingent on the presence of receivers in many reformed classrooms. Such retraining would have been necessary for reform in any case, as shown by the decision to retrain primary teachers before deciding on the extension of ITV to grade schools. In other countries and under other circumstances, retraining costs may have to be charged to ITV. This demonstrates that cost accounting models must be tailored to fit the individual situation.

Another aspect lies in the temptation to classify training programs as an investment instead of an operating expense. Retrained teachers may be considered an increase in human capital, with a useful life of more than the one year accountants take as the dividing line between current and capital expenditures. However, authorities in El Salvador are now thinking in terms of a continuing retraining and mid-career renewal effort for teachers, especially at the primary level, so that the line between current operations and investment, or start-up costs, becomes blurred. It seemed less confusing to waive an academic point and to consider teacher retraining as an ongoing, current outlay of the reform.

Technical assistance has been costed conservatively. The bulk of the cost of maintaining the Education Division at AID/ES is included--as functionally it should be--in grant-funded technical assistance. The same treatment was accorded to UNESCO. Such missions exist in other countries, without the necessary presence of Reform/ITV, which undermines the position of these overhead costs as incremental to any specific program. On the other hand, the expense of sending out several study teams and the management costs of AID/W on behalf of El Salvador have not been included. Perhaps regular AID administrative expenses are not true opportunity costs, but treating them as such at least serves to balance some deliberate omissions of minor reform costs elsewhere in this report.

Finally, some difficulties of procedure have to be faced in start-up costs. High visibility marked the planning activities of foreign missions whose costs could be assigned to reform--in the case of the United Kingdom as early as 1965. Corresponding pre-reform deliberations also took place of course at the top levels of the Min/Ed, but more obscurely, and both the identification and dating of these activities was too awkward a task to justify the meager return of significant information. This local cost was thus excluded. The sole exception, noted in the preceding chapter, was the ITV budget in the years prior to program production. Here the start-up costs on the Salvadoran side were clear-cut and succinct.

Investment Outlays

The capital budget part of "Non-ITV Reform" remaining to be analyzed presents a dilemma as to what outlays should be properly included. Three major school construction projects, listed in chronological order, offer themselves as candidates. All are "Reform-impacted:" the Central American Technical Institute; the Diversified High Schools; and the "One-School-A-Day" project aiming mainly at the primary but also the junior-high-school level (Table 2.16).

TABLE 2.16

Non-ITV Capital Expenditures Due To Educational Reform In El Salvador 1968-1973

(In million of colones)

Project	Dates	GOES	Foreign Source
(1) Central-American Technological Institute	1967-71	₡0.8	₡0.6 [1]
(2) Remodeling of ITV-Classrooms	1968	2.3	--
(3) Recreation Centers, Teachers and Students	1968-70	0.5	--
(4) Diversified High Schools	1970-72	7.5	12.5 [2]
(5) "One-School-A-Day" and Junior High Schools	1971-74	5.2	14.1 [3]
Totals		₡16.3	₡27.2
Memo: Imputed Costs			
(6) School Lands acquired by Gifts and Community-built Schools	1971-73	₡10.6	--

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1/ British grants.

2/ Loan by International Bank for Reconstruction and Redevelopment; includes minor amounts for technical assistance. Revisions may subject the Salvadoran contribution to a modest increase.

3/ Excludes loan portion of AID Loan 014 for television receivers and technical assistance, accounted for elsewhere. Salvadoran contribution excludes ₡1.0 million charged against technical assistance.

NOTE: Completion dates of projects are approximate. Construction costs in (4) and (5) include charges for supervision by COPLACE.

Sources: Ministry of Treasury, Informe Complementario Constitucional; Ministry of Education, COPLACE.

The trouble is that as early as 1963 El Salvador made a remarkable effort, under AID Loan 003, to lick the classroom shortage. That was long before the advent of the current reform. The program under AID Loan 014 looks very much like a continuation of its predecessor, except for the new 3-3-6 pattern and greater stress on the upper grades. Since both El Salvador and AID/ES blanket this project under reform, it will be so listed: straddling the issue makes little difference for this paper. Some other educational investments owe their existence to reform and hence constitute part of a total which amounted to ₡43.5 million, of which ₡27.2 million was financed through foreign loans and gifts.

A brief description of these capital investments may be helpful. The Central American Technological Institute is designed for modern vocational training at the foreman level, stressing mechanical, electrical and civil engineering. The Ministry's recreation centers, including a seaside resort and sports installations for students, have been constructed during the last four years and reflect a more generous view of educational improvement than what is embodied or goes on between the four walls of a classroom. The diversified high schools represent a serious attempt to begin bridging the gap between school and the job market through specialized curricula, embracing some non-academic fields such as commerce, agriculture and even tourism and the hotel trade.

The purpose of AID Loan 014 is to add to the supply of classrooms in the nine grades of "basic education," utilizing the 3-3-6 concept in the primary school portion of the project. Notwithstanding popular belief, few extra schools will be added at the primary level, although the number of rooms will grow. The thrust will be at the replacement and expansion of "dilapidated" one- and two-room buildings, where often not stone but thatched huts and dirt floors are the problem. Policy also calls for replacing rented quarters for which the Min/Ed is currently laying out something like ₡500,000 a year, enough to carry a respectable construction loan.

A number of schools are being built by a community self-help program known as FOCCO, especially in places inaccessible by truck and heavy construction equipment and materials. A recent rate of termination and turnover to the Min/Ed was three schools per month. The value of these schools and another imputed cost--the donation of school lands--were put at ₡10.6 million as of mid-1971 by COPLACE.

Parenthetically, El Salvador's building programs show a lower cost per square foot of classroom put in place than any other country in Latin America, according to some figures compiled by AID/ES in 1967. This was confirmed more recently by CONESCAL, a largely U.N.-funded agency located in Mexico City that does research in school construction and has acted as one of COPLACE's principal advisors.

Summary

The key to the structure of the Min/Ed's budget is to recognize that its bulk goes for operating expenditures, mainly teacher salaries, in primary education, but that lately the high school program has been gaining ground. Reform-related spending, until 1970, was minor.

Outlays for education have been growing a lot faster, even before reform was much heard of, than the national budget as a whole. The two in fact are on a collision path. Unless the Min/Ed's spending slows down or else national revenue picks up momentum, educational costs are headed for a point where they would absorb as much as one-half of available central government funds. That it would ever come to such a pass seems improbable in the extreme.

Reform costs with or without television were not much of a strain on the budget, accounting for no more than 2 percent of the operating budget and for even less relative to the total. (When ITV operations were charged to the junior high school program alone, they added something like 15 percent to annual cost per student at the present scale of audience participation as discussed in Part III. Projecting outlays for ITV into the near future, even the much talked about expansion to the six primary grades was unlikely, if undertaken, to become financially embarrassing and hence a deterrent costwise.

Under the heading of operating expenses, production costs per 20-minute program--the standard output unit of the studio--was determined to be about ₡600 at current quality levels. This figure includes an allowance for a

70 percent revision of content within a three-year program life. Also included are tape costs, the preparation (but not printing) of teaching materials, and transmission. This part of the study also estimated the amounts of recurrent capital costs at the central studio complex, at two successive stages of system capacity, as well as start-up and reception costs.

A final section identified and costed several planks of the reform other than those directly linked to television. Spending levels for programs such as training, supervision and curriculum review turned out to be surprisingly modest. The major part of the money spent in non-ITV associated activities was earmarked for school construction, a category that is difficult unequivocally to classify as entirely reform-generated, although such was the prevailing opinion at the Min/Ed and at AID/ES.

PART III

IMPROVEMENTS IN THE EFFICIENCY OF THE EDUCATIONAL SYSTEM

Introduction

El Salvador is not the only country which feels that the design and performance of its system of education leave a lot to be desired, but stands out in the way her Government is trying to improve the situation. Reform is wanted not solely for the benefit of an existing student population. It is intended to help promote education as a way of life for the many young people who for one reason or another never manage to enter school or stay until graduation. It also bears noting that Minister Beneke and his immediate official family have been able to work closely and effectively with the educational advisors at AID, the major financial back-up of Reform/ITV, as well as with UNESCO, the World Bank, Japan, and Great Britain.

The specific educational problems of El Salvador in a nutshell are:

1. An inadequate rate of school-going, despite visible progress in the last decade.
2. A closely related deficit in school-rooms, in well-trained teachers and in modern teaching materials.
3. Until recently, an antiquated curriculum and teaching methods and, still to be remedied, a lack of implementation of new study plans at the primary level.

The proposed, and to an impressive extent already executed answers to these problems--pursued in concerted fashion--are:

1. Free basic education to the ninth grade, with a revamped, vocationally-oriented senior high school system.

2. An ambitious blueprint for school building, partly community initiated, which is expected to function under a new cost-saving organization pattern.

3. Plans now firming up for longer-range, continuing primary teacher retraining in the use of new and culturally enriched study programs, books and materials.

These come in the wake of the introduction of integrally reformed junior high school grades, a step which, at its core, uses instructional television.

Part of the systems thinking at the Ministry applies to the reorganization along managerial lines, greater attention to planning the extension of its supervisory grid, recreational facilities for students and teachers, music and arts programs, and a host of lesser but equally significant changes in activities.

A worrisome unknown in the equation is what these changes cost and what they will produce. As will be seen, a "linear" expansion of the system involves a far more formidable climb of the cost curve than all the qualitative and enrichment-of-media changes of reform combined.

Improvements in education, as in any productive process, come in two dimensions, quality and quantity. Stanford University's companion studies on Reform/ITV focus on quality, that is, better teaching and learning. This report looks largely at physical throughput, or student flows, and the cost of handling present and planned future volume.

For Salvadorans the bill for and the benefits of Reform/ITV are only one aspect of their educational economics. Wrapped up with changes in the system are the possibilities and costs of expanding it. Accordingly, this part of the study will deal with five principal questions:

- The bill for putting all, or here virtually all, Salvadoran children of normal school age through the sixth grade.
- The possible reduction in this bill by the adoption of the so-called "3-3-6" pattern of grade school organization.
- The cost of extending free schooling through grades 7-9 of junior high school, assuming this level is needed to attain functional literacy.
- Possible savings in the grade school program by reducing or eliminating the need for repetition through improved learning through Reform/ITV.
- The achievement of a more cost-effective media package through less labor-intensive instruction.

The Bill for Covering the Educational Deficit

The new Law of Education, incorporating the principal ideas developed by Minister Beneke during his tenure in office, and promulgated by the Administration in August of 1971, focuses on a key goal: that schooling through the ninth grade, to be known as *educacion basica*, shall become general for all Salvadoran youngsters. This means that the old Plan Basico is being incorporated into a new nine-year curriculum, adding three years of school for the country at large. The budget repercussions of such an ambitious undertaking are bound to be overwhelming.

This kind of objective in practice is likely to be approached in stages, doing what comes most naturally first: meeting the demand for additional enrollment as and wherever it may arise. In long-range formal planning, by contrast, such improvisation is out. Here the need is for detailed annual projections of registrations, grade by grade. Such an undertaking was well outside the time and financial limits of this study. A new planning office in the Ministry of Education will have to take charge of this task, periodically updating such related determinants as repeater, retardation (i.e., late, over-age enrollment) and drop-out rates. Finally, the entire data base will have to be classified by age-groupings and be geographically subdivided. This is a large undertaking that has barely been started.

To cut the Gordian knot and present some useful information to the Ministry, this study picked selected, specific enrollment targets in order to illustrate the magnitude and particularly the cost of the job involved. These targets run in terms of "educational deficits", a concept admitting diverse interpretations. Commonly it refers to the number of school-age youngsters who lack the years of attendance necessary to attain certain educational objectives, be it graduation from the sixth grade, the ninth, or whatever. Since these students must be housed in school buildings, a second kind of deficit--that of classrooms and students places -- must be considered. The resulting twin deficits, related but not in one-to-one fashion, correspond to the two major budget divisions in El Salvador, current operations and capital investment.

Of several possible targets, two were chosen for evaluation. One was the additional cost of permitting all children enrolled in public primary school right now to spend the years necessary to finish the sixth grade. This target population, be it noted, omits children who never register in school at all. Second, we will be looking at the additional cost of putting all present graduates of the sixth grade of public school through the "third cycle", that is, have them complete grades 7-9. This second goal will be dealt with in a separate section below.

These targets are relatively modest. They do not even touch the "never enrolled" children who seldom see the inside of a schoolhouse except on a visit. Yet they serve to show, if related to the baseline budget figures produced earlier in this report, what kind of financial load the Minister of Education would be assuming if it carried out only a part--probably the major part--of its promises. To quantify the implied rise in enrollment, or rather additional annual student places to be provided, simplification had to be the order of the day. The methods, models used and necessary assumptions--hopefully reasonable enough for practical purposes--are set out below.

Choice of a Deficit Concept

Simply as a frame of reference, as a point of departure in evaluating the first target, we may want precisely to define the total deficit of El Salvador and assess its theoretical dimensions. In this case, the missing number of student-years would constitute a maximum goal: to have each Salvadoran child pass through the sixth grade within a certain youthful age-span. The proper way to accomplish this would be through "cohort analysis" in its strict chronological connotation. This would mean, for example, following all children reaching their sixth birthday in a given year along their school or non-school careers. The children comprising the educational "deficit" group, by definition, would be those who failed to graduate. Should we be able to identify them, specifying in each case the lacking number of school-years, we would have succeeded in the first important step of measurement.

To do the job with precision, one would be prevented from the short-cut of defining a cohort simply as an entering class in the first grade, ignoring the age of the child. While this was precisely the methodology adopted later in this report, it was done by necessity and not by choice. A "cohort" more loosely defined as all first-time first-graders who enroll in a certain year is, in El Salvador, quite a mixture of ages. In the upper grades, the age dispersion widens further as former drop-outs keep returning to the fold.

The sorts of deficit just defined--belonging to a family of deficit concepts--may be called "functional" because they are directly related to a decision criterion with a final ring to it: youngsters falling short are deficient in formal education, with the consequence that their work performance, as well as ultimately national income and development, will suffer. Failures in the social realm constitute an additional set of inadequacies chargeable to this group.

Quite a different sort of deficit concept, rather useless for costing functional objectives in education might be called "custodial". This at a given time--usually when school opens--is simply the number of school-age children not registered for classes. When computed as a percentage of school-age youngsters, say 7-15 years old, this "gap" may possibly serve as a proxy to measure unmet educational needs. It may also serve, by comparing the number of children who ought to be in school with those actually present, roughly to estimate at one point in time how much larger the budget would have to be if the system were to take custody of the entire target population. The slack in vacant student places would also have to be known, else there would be an over-estimate of actual needs and costs. COPLACE, the Minister of Education's construction arm, used this ratio as a ranking indicator to help determine priorities for the location of new classrooms.

Returning to the concept of a total deficit, for analytic convenience this may be divided, along with the bill for meeting it, into two constituent parts. One is the group of children who enter school but never finish; they leave their imprint on the school statistics. The second group never registers in school, except possibly much later as young adults.

Because of the difficulties of taking a census of the latter group of school avoiders or "permanent truants," the deficit student years estimated below refer only to the first group of "once-enrolled". The cost estimates of covering the missing student years and student places, in broad terms the scholastic deficit, are therefore understated. This report, in the absence of data, cannot tell by how much. Some discussion of this problem will be found in Appendix IV.

To repeat, we conceptually distinguish between a current deficit, of a once-enrolled school-age population being wasted, and a total deficit which, besides children, may well include the accumulation of teenagers and adults who never went to grade school, or if they attended, never finished the sixth grade. This backlog of "illiteracy" would have to be covered by an adult education program, perhaps in connection with the use of ITV.

Estimation of First Educational Target

A rough and ready approximation to the deficit to be estimated first, that applying to deserters and drop-outs in the primary grades who never complete the sixth grade, can be calculated from a special "cohort" representing a given year's once-enrolled students. Here we take those entering the first grade in 1964 and graduating in 1969. The techniques and assumptions used will be found in greater detail in Appendix IV.

In essence, what is necessary is to identify the number of drop-outs by grade; to multiply each group by the number of "deficit-years" or school-years missing to reach the sixth grade; to make an allowance for the presently available privilege of repeating; and to add the latter by way of adjustment. This procedure gives us the deficit of annual student places for the primary-school target, here 267,000 (Table 3.1).

TABLE 3.1

PART I. Educational Deficit in Primary Grades of El Salvador, 1964 "Cohort" 1/

Year	Grade	Initial Enrollment	Year-End Status		Drop-outs 2/	Number of Deficit Years			Repeater Rates
			Continue	Repeat		Per Student	Totals 2/	Repeater Adj. 4/	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		(In thousands of students)				(In thousands of student yrs.)			(Percent)
1964	1	133.2	61.4	40.1*	31.7	5	159	32	30%
1965	2	78.8	53.6	19.0*	6.2	4	25	5	24
1966	3	66.9	51.2	9.5*	6.2	3	19	4	14
1967	4	58.2	41.9	8.2*	8.1	2	16	3	14
1968	5	46.6	38.8	3.7	4.1	1	4	1	8
1969	6	41.8	34.0 5/	4.2	3.6	0	0	0	10
Totals		425.5	-	84.7	59.9	-	223	45	-

Analytic Measures:

(a) Average Repeater Rate during six grades for "Cohort": Totals of (5) : (3) = 20 percent.

(b) Ratio of Deficit Years to Actual School Years for Students in "Cohort:"

Including years repeated in grade: (8 + 9) : (3 + 5) = 267 : 510 = 52 percent.
Excluding years repeated in grade: (8) : (3) = 223 : 426 = 52 percent.

1/ "Cohort" is a statistical artifact, based on enrollments in subsequent grades and years of class of 1964 (For discussion see text).

2/ Equal to (3) - (4 + 5).

3/ (8) = (6) x (7).

4/ (8) x 20 percent.

5/ Graduates of sixth grade

Sources: Ministry of Education, Memoria de Labores, 1969-70, p. 97; (*) Documento 1 de la Reforma Educativa, Anexo II ("Roberts Report").

TABLE 3.1 (Continued)

PART II. Estimated Cost of Covering the Educational Deficit in the Primary Grades

Item		Amount
A. Given Conditions		
(1) Budget for Primary Education (1971) 6/		₡ 45.3 MM
(2) Budget in (1) adjusted for Automatic Passing 7/		₡ 36.2 MM
(3) Operating Budget, Ministry of Education (1971)		₡ 64.9 MM
(4) Enrollment, Grades 1-6 (Feb. 1971-public schools)		540,000
B. Additional Cost of Covering Deficit	Surcharge 8/	
(5) Maximum Increase in Primary Education Budget (1)	52%	₡ 23.6 MM
(6) 50 percent of (5)	26%	₡ 11.8 MM
(7) Maximum Increase in Primary Budget (2) supposing Automatic Passing	52%	₡ 18.8 MM
C. Additional Student Places Required		
(8) Maximum Required Increase in Enrollment	52%	280,000
(9) 50 percent of (8)	26%	140,000

MM - Million

6/ Basic Education program prorated on basis of salaries paid to primary and "third-cycle" (old Plan Basico) teachers.

7/ Reduction of (1) by 20 percent, the average repeater rate of 1964 "cohort". (Part I of Table: Analytic Measures)

8/ Required increase in number of student places per year to wipe out deficit.

Source: Ministry of Education, Ley de Presupuesto and Ley de Salarios, 1971.

This sum has several possible further uses. First, multiplied by the ₡85 unit cost per student in the primary program, it gives us the upper boundaries of the budget burden for the target being estimated, here given as a rounded sum of ₡23.6 million.

Second, if we now wish to assume the adoption of automatic passing some day in the future, we can eliminate the previous adjustment for repeated years and get a smaller budget cost of ₡18.8 million. As an educational practice in general, and as applied to the circumstances of El Salvador in particular, the pros and cons of automatic passing are not a topic germane to costing. It may be suggested, nevertheless, that the enforcement of attendance, as through a system of truant officers or the like, would mean a substantial expense for the Ministry of Education.

Third, we may relate the deficit years attributable to the 1964 "cohort" with the number of years its members actually spent in school, yielding a coefficient by which the budget would have to be raised to meet the missing student years.

We may make this last comparison in two ways, including and excluding repeated years. These last calculations have the convenience of giving us the ratios by which the current primary school budget might have to be raised to accommodate drop-outs wishing to terminate grade school. In both cases, that ratio turns out to be 52 percent. Taking the larger total 1971 operating budget of the Minister of Education as our base, the increase in costs drops to 36 percent.

Actually, to translate the deficit figures as they stand immediately into costs would be dangerous. The reason lies in the existence of considerable underutilized classroom space--particularly in the higher grades of primary school--which may accommodate deserters at no, or hardly any, extra cost. How much room exists and where is difficult to say at the moment; the Ministry of Education has just recently begun collecting suitable data. On the other hand, the countryside is full of three-room and small school-houses in bad repair, lacking the upper grades and locking out students who may wish to continue.

To allow for this excess classroom capacity, we made a further estimate of the budget increase required to cover the deficit. On the supposition that as many as one-half of the deficit-students could fit into sparsely occupied classrooms, we arrived at a cost of ₡11.8 million.

As the budget increased along its baseline path, over time, assuming an absence of Reform and the structure of enrollment to remain reasonably stable, the cost of covering the deficit would of course increase proportionately. Moreover, rising enrollment is soon bound to fill the upper grades and cut into unused classroom space.

To test the validity of our figures we may resort to an independent estimate of children 7 to 14 years old not in school during 1968. The computation was carried out by COPLACE, extrapolating 1961 Census figures given by Departments and comparing these geographic youth populations with enrollments. The "custodial deficit" so derived came to 223,000 children, all outside the capital city. San Salvador, in fact, had a "surplus" because of an influx of students residing elsewhere.

Still another quick check was run comparing 1970 demographic estimates of 6 to 14 year olds with enrollments in grades 1 through 9. The "custodial deficit" calculated in this fashion ran to a minimum of about 180,000 and a maximum, which included economically active youngsters between the ages of 10 to 14, amounting to 225,000.

In the light of these figures which run fairly close to the top "functional deficit" calculated by the cohort method, it looks as if the mid-point estimate of the budget burden is the absolute rock-bottom for a realistic costing of the primary school target. Caution counsels against accepting maximum estimates but here is an instance where supporting evidence strongly buttresses this alternative.

Even without Reform, school attendance is expected to rise in relation to the eligible population, if trends of the last decade continue, as shown earlier in Table 2.5. If, as seems logical, this rise were to occur mainly in the rural, drop-out prone areas, one would expect the wastage years to exceed the 52 percent estimate unless retention rates underwent some unforeseen radical changes.

In terms of student places, the load is equally severe. By 1975, and again in the absence of Reform, our best estimate calls for a student body in primary schools of 670,000, an increase of 130,000 or 24 percent above 1971 enrollment. Covering only half of the deficit as just estimated would require, independently, of normal growth, another 175,000 new student places, equal to a 26 percent extra expansion. What this means is that in order to keep a reasonable amount of current drop-outs in school through the sixth grade, the Ministry of Education would have to more than double the desk space that one would expect it to provide under baseline conditions within the next four years.

The Classroom Shortage or "3-3-6" to the Rescue

Policy-makers in the Min/Ed must have long been aware that the deficit in school attendance was of immense proportions. But the resolve to tackle the problem could seldom have been stronger than under the present Administration. Heroic measures were called for, and the "3-3-6" pattern of school organization seemed ideally designed to fit the bill.

The concept is familiar and has been around for years. The main objective is to double the capacity of the system by scheduling two shifts per classroom, one grade in the morning and one in the afternoon. A typical three-room schoolhouse can thereby accommodate six grades instead of three. The teacher, on the other hand, is obliged to instruct two grades instead of one, so that three teachers are an adequate complement to handle the load.

In these terms, the change-over is hardly fair to the teacher, assuming he has his hands full in the first place--say 50 students and more per class. Accordingly, two adjustments are necessary: a cut in class-hours per grade and a raise in salary to compensate the teacher for assuming the burden of an extra grade.

Once fully implemented, the switch-over from a traditional or "6-6-6" system to a "3-3-6" allows schools to accept twice as many children as before with a minimum of additional cost. To quantify the various repercussions in actual practice, in a country like El Salvador, an extensive and detailed census of educational facilities and their student bodies, school by school, would be necessary. This is not yet available. Nor do we know with confidence just how and where the "3-3-6" system has been implemented. Again, this will be a job for the new planning office.

For our purposes, it seemed sufficient and advisable to construct a normative model of a school in operation, to show what the pros and cons of "3-3-6" would be under existing Salvadoran conditions when compared with the traditional pattern. The exercise is by no means purely academic, because the massive building program financed by AID Loan 014--popularly known as "One-School-A-Day"--is largely designed to take advantage of the benefits believed inherent in this innovation.

The first item to be considered, therefore, might be investment in school buildings (Table 3.2). The cost difference here is over ₡23,000 for each three-room module. This is not precisely one half of the cost of conventional building, because the expenses of leveling and landscaping the lot would be about the same in either case.

One might question whether per-room costs of a traditional six-classroom school would be fully twice as expensive as those for a three-classroom building. Actually, estimates by COPLACE architects on the costs of new

TABLE 3.2

COSTS AND OUTPUTS UNDER THE "3-3-6" SYSTEM: COMPARISONS WITH A TRADITIONAL SCHOOL MODEL

	Traditional		"3-3-6"		Difference 1/	
A. Investment Costs 2/	Number	Amount	Number	Amount	Number	Amount
(1) Number of Classrooms	6	-	3	-	-3	-
--Number of Grades	6	-	6	-	0	-
(2) Costs: Construction (₡6,500 per room) 3/	-	₡39,000	-	₡19,500	-	-₡19,500
(3) --Furniture & Equipment (₡1,300 per room)	-	₡ 7,800	-	₡ 3,900	-	-₡ 3,900
(4) --Landscaping	-	₡ 2,000	-	₡ 2,000	-	0
(5) Total Costs	-	₡48,800	-	₡25,400	-	-₡23,400
B. Teacher Inputs						
(6) Number of Teachers	6	-	3	-	-3	-
(7) Working Hours per Day (Legal)	5	-	6	-	+1	-
(8) Working Hours per Week (Legal)	30	-	34	-	+4	-
(9) Teaching Hours per Week	25	-	30	-	+5	-
(10) Counselling Hours per Week	4 4/	-	4	-	0	-
C. Teacher Costs						
(11) Salaries per Month 5/	6	₡ 1,260	3	₡ 780	-3	-₡ 480
(12) Annual Salaries	6	₡15,120	3	₡ 9,360	-3	-₡ 5,760
(13) Annual Fringe Benefits 6/	6	₡ 410	3	₡ 205	-3	-₡ 205
(14) Total Teacher Costs	-	₡16,790	-	₡10,345	-	-₡ 6,445

1/ "3-3-6" model less traditional model: - = savings; + = additional cost.
2/ Cost figures are COPLACE estimates in July 1971.
3/ Based on estimates for new "3-3-6" schools by COPLACE in connection with AID Loan 014 (August 1971).
4/ Adjusted downward to conform to actual practice in field.
5/ Class A, 4th Category: ₡210 per month plus ₡50 per month for "3-3-6" teachers.
6/ Christmas bonus and medical services.

Source: See end of table.

TABLE 3.2 (cont.)

COSTS AND OUTPUTS UNDER THE "3-3-6" SYSTEM: COMPARISONS WITH A TRADITIONAL SCHOOL MODEL

	Traditional		"3-3-6"		Differences	
D. Administrative Costs	Number	Amount	Number	Amount	Number	Amount
(15) Extra Payments for School Director per year	1	₡ 240	1	₡ 600	0	+₡ 360
E. Total Payroll Costs						
(16) Total Personnel (14) + (15)	7	₡17,030	4	₡10,945	-3	-₡ 6,085
F. Student Body						
(17) Number of Students (40 per class)	240	-	240	-	0	-
G. Class-Hours (By Clock)						
(18) --Daily, per Grade	5 6/	-	3 7/	-	-2	-
(19) --Weekly, per Grade	25	-	15	-	-10	-
(20) --Monthly, per Grade	100	-	60	-	-40	-
(21) --Annually, per Grade	900	-	540	-	-360	-
H. Payroll Cost per Student						
(22) Annual Faculty and Administrative Salaries	-	₡ 56.8	-	₡ 36.5	-	-₡ 20.3
I. Savings of "3-3-6 Model School		Amount		Percent of Traditional Cost		
(23) Teacher and Administration Cost		₡ 6,085		35.7%		
(24) Investment in School Building		₡23,400		48.0%		
J. Reduction in Class Hours						
(25) Annual Cut in Clock Hours		-360		40.0%		

6/ Five subjects in five 50-minute class periods.
7/ Four subjects in four 40-minute class periods.

Source: Ministry of Education, Department of Supervision; COPLACE.

four-room Plan Basico and nine-grade comprehensive schools in urban and rural (but not metropolitan) areas indicate that per classroom costs are considerably higher for the larger schools. The reasons for this were not investigated for purposes of this study. Thus, the above comparisons seem, if anything, to err on the conservative side in trying to document the cost advantages of the "3-3-6" schools.

As to salaries, the principal current school expense, the advantage of the "3-3-6" pattern was a saving of over one-third, not one half. Even though the number of instructors was cut in half, the rise in teaching and administrative load had to be compensated for by premiums in salaries.

Still, these are tremendous savings in any enterprise. For existing schools adaptable to the "3-3-6" pattern, enrollment could be doubled. How many schools are eligible and how many are already working under this regime is impossible to say at the moment. Data are being gathered. The AID Loan 014 building program, which may run to about 1,200 primary "3-3-6" schoolrooms with a capacity of 40 students each, will incorporate a saving in investment that may be estimated at ₡9 million for 400 modular buildings. The annual operating savings for the 48,000 students involved, if classrooms were filled to capacity, could run to ₡2.5 million due to lower payrolls.

Note: it may be mentioned that only private schools in the larger cities provide any kind of transportation for students. Students in the rural areas walk to school. In the budget of the Min/Ed, the equivalent of busing costs of American schools do not exist.

Another rough but serviceable calculation may be made. In 1970 the public sector could count on about 9,000 primary classrooms in schools that had at least three rooms. If these were all in good condition, if enrollment demand existed, and if 40 students could be crammed on the average into each room, there would right now be surplus of 360,000 student places. The problem is that none of the "ifs" hold much promise.

Still, an important conclusion emerges from these calculations. There is, according to our model, an annual saving of roughly ₡6,000 in payroll cost for each typical "3-3-6" school, which would just about be enough to build one new schoolroom each year, without equipment. The savings in four years, however, would almost pay for constructing an entire standard three-room module at current costs. Putting it differently, a loan to build new "3-3-6" schools could be fully amortized from payroll savings within four to five years, including interest to the bank or some foreign lender. That perhaps is the most cogent financial message in this section.

There is another aspect: If the last decade is any guide, the national income and the national revenue will grow, and the Min/Ed will get its proportional--if not larger--slice. This increase, which we may call a "growth dividend," has in the past gone into hiring more teachers--at a rate of about 600 positions a year over the past decade just about absorbing the ₡2.4 million increment in the operating budget. Yet this policy has been inadequate to cure the educational deficit in terms of student places. In many localities, the absence of higher grades, and of course the classrooms and teachers that go with them, has had a "lock-out" effect on students wanting to continue on through the sixth grade.

What the "3-3-6" model tells us is that, as an alternative, the same money might be better employed in putting up--new or as replacements--the modular type of school, using the salaries saved to repay the loan. In theory, once the whole primary system was converted to double shifts, with enough schoolrooms to cover the backlog and to wipe out the hovels masquerading as schools, payroll savings would be available for better teacher salaries and teaching materials.

The most vulnerable part of the "3-3-6" system is that it skimps on the child. A 40 percent reduction in attendance hours, no matter how one looks at the scheduling of four subjects in 40-minute classes, is bound to reduce learning. It is not believable that teaching at the primary level is so dismal that cutting class sessions to that degree makes no difference. Further, it will be difficult to convince people looking at the "3-3-6" pattern at close range that three and five are equal.

Apart from this point and of importance in a public relations effort to win support for "3-3-6", the impact on the teachers is another matter of major concern. What will actually occur in the field under the pressure of stepped-up work loads--20 percent more teaching hours, not counting doubled-up grades--can only be guessed. The "3-3-6" system cries out for something for which this report argues throughout these pages: a cost-effective mix of media under the direction of some creative, imaginative people. Considering the highly competitive cost of ITV when used under optimal economic conditions--that is, with minimal monitorial assistance as explained in a later section--here is a way to relieve the overburdened teacher and enrich the learning environment. The orchestration of the input scenario--and media like programmed texts, independent study and group sessions are not to be ignored--is a topic rightly belonging to another discipline. But costwise, "3-3-6" plus ITV would seem to fit into a broader concept of a cost-effective educational system making use of instructional technology.

We did not make equivalent computations for double shift use of classrooms to accommodate two grades a day for grades 7-9 of the third cycle. Three grades obviously lack divisibility by two so that the "3-3-6" pattern cannot be fully translated. Nonetheless, the economics of double shifts point in the same direction and, costed out, should give similar results. As yet the eighth and ninth grade do not operate during the afternoons. The relatively small student body at the Plan Basico level and the correspondingly modest budget effect at present suggest that, in the interests of time, this costing exercise be suspended.

The Bill for a Universal "Junior High School" Education

A second target implied in the Reform program and worth investigating, is the addition of a third study-cycle to the six grades of primary school. Taken at face value, however, this goal and its cost are simply unfeasible.

As before, abstracting from the statistically elusive never-enrolled, we may restrict our calculations to children who have at least once registered in first grade. Since, to become eligible for entry into the seventh grade, they must first graduate from the sixth, we assume zero wastage in-between.

Repetitions and desertions are so minimal in the old Plan Basico grades, thanks to an elaborate make-up system for failed examinations, that we can ignore this otherwise noxious complication.

By simple stages we thus arrive at a point where we can estimate, without first having to consider cohorts, the third-cycle cost for roughly 150,000 children registered for the first grade of public primary school six years ago, in February of 1966, and ready for the seventh grade in 1972. Again, we include repeaters of earlier entrance years as substitutes for repeaters who will join later classes.

Since about 20,000 of the "class of 1966" may be expected to continue on to junior high school anyway in 1972, we are left with a "deficit" of 130,000 youngsters who would require three additional years of course work. The cost would run, at ₡250 apiece annually, to ₡98 million for a full third cycle (Table 3.3).

Embodied in this estimate is an assumption that, of roughly 8,000 students currently registered in the seventh grade of private junior high schools, only about one-half that number would do so in the future, the rest opting for the public system. This assumes two things: it takes account of the about 4,000 sixth-grade graduates of private schools not included in the previous calculation; and it makes allowance for the rather conspicuous current shift of students out of the private and into the reformed public secondary school system.

TABLE 3.3

COST OF TWO ENROLLMENT TARGETS FOR JUNIOR HIGH SCHOOL

A. Universal Nine-Grade Education	
(1) First Grade Class Public Primary School (1966) 1/	150,000
(2) Students Entering Seventh Grade (1972)	20,000e
(3) "Deficit" students in (1) not continuing to Seventh Grade	130,000
(4) Student-years required for Completion of Third Cycle (3)x3	390,000
(5) Unit Cost per Student-Year (1971)	₵ 250
(6) Estimated Operating Cost of Covering "Deficit" (4)x(5)	₵ 98 million
(7) Adjusted Operating Cost, Assuming Double Shifts and Payroll Savings Similar to "3-3-6" Pattern: 70 Percent of (6)	₵ 69 million
(8) Additional Classrooms Required, Double Shift and 40-student occupancy (4) ÷ 80	4,875
(9) Investment Required (₵10,000 per room fully equipped)	₵ 48.8 million
B. Completion of Nine Grades by All Graduates of Sixth Grade	
(10) Graduates of Sixth Grade (Estimated 1971) 2/	40,000e
(11) Students Expected to Enter the Seventh Grade in 1972 3/	20,000e
(12) Number of Students within Target (10-11)	20,000
(13) Student-Years Required for Completion of Third Cycle (10)x3	60,000
(14) Unit Cost per Student-Year (1971)	₵ 250
(15) Estimated Operating Cost of Covering "Deficit" Group (13)x(14)	₵ 15 million
(16) Adjusted Op. Cost, Assuming Double Shifts and Payroll Savings similar to "3-3-6" Pattern	₵ 10 million

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e - Estimated

1/ Includes Repeaters

2/ About 95 percent of fifth grade graduates in 1970.

3/ Based on continuation rate of 50 percent shown between 1970 and 1971.

Sources: Ministry of Education, Dept. of Statistical Services: COPLACE.

Some Adjustments in Costs

The ¢98 million cost estimate requires two downward adjustments: one for a possible full use of double shifts in junior high schools, associated with higher teaching loads; and another one for greater classroom density expected as the system filled up, reflected in higher student-teacher ratios. In 1970, that ratio stood at about 31 in the public Plan Basico schools, but it has risen towards 40 and probably more in the seventh grade which, in 1971, experienced a minor inundation of new students. As for double shifts, we are informed that the eighth and ninth grades still function only in morning sessions, a situation that is bound to change as the seventh-grade entering wave laps at the doorstep of the next higher grades.

The downward budget impact of increased teaching hours, even at the expense of some extra compensation, as well as that of greater room occupancy, could be considerable: school costs are very sensitive to these items. We noted already that in the "3-3-6" pattern, payroll costs can be sliced by over one-third. Still, a bill for ¢69 million would be a conservative guess in costing the junior high school target. The urge to assume administrative economies of scale must be checked because the central bureaucracy not only grows with the expansion of the system but seems prone to do so faster, as observed in an earlier section.

The sum just mentioned, not far from equal to the Min/Ed's entire operating budget for 1971, is big enough to "break the bank." Moreover, it is due to rise with each coming year unless the birthrate declines unexpectedly.

A high school education for every Salvadoran child is more a noble aspiration than something that is soon attainable from the standpoint of either operating expenses or of construction outlays. The latter, on a volume basis according to COPLACE figures, might be costed at ₡10,000 per fully-equipped classroom, each holding 80 students by means of two sessions a day. On these terms, our 130,000 students--if subsequent entering classes were to stay at that level--would need about 4,900 additional classrooms calling for an investment of ₡49.0 million. Such a sum is not likely to be available.

A Scaled-Down Target

Credit is due to the leadership of the Min/Ed for embarking on the rocky road of intensifying school attendance and defying the prosaic difficulties of finance. Realism urges us however to choose another, more achievable target. We might perhaps evaluate the feasibility of putting all graduates of public primary schools through the ninth grade. El Salvador has just passed a milestone on the way toward this objective: in 1971, the number of students registering in the public seventh grade exceeded one-half of all sixth grade graduates of the year before. That the ratio stood at only 35 percent in 1970 meant a respectable jump, perhaps not to be repeated in a single year again soon. In effect, this second target also makes implicit allowance for a massive shift of students from private to public junior high school, representing a cost which the Min/Ed would absorb. As recently as 1971 about 4,500 students still went in the opposite direction, from sixth grade of public school to the seventh grade in private junior high.

Our target population now shrinks to something like 40,000 students who may be eligible to continue to the seventh grade by the end of 1971--one-half now being prepared to do so and 20,000 still to be admitted under the proposed program. With minimal wastage and repetition, this calls for a maximum of 60,000 student-places to be added over a three-year period. Allowing for the passage of time until three successive "deficit" groups have registered in the junior-high system, the incremental student load can be estimated at 20,000 in 1972, something like 40,000 in 1973, and perhaps 60,000 in 1974. Enrollment growth and attrition will likely balance out to give these figures credibility. Again, at third-cycle unit costs of ¢250, the additional bill would at a maximum be ¢5.0 million, ¢10.0 million, and ¢15.0 million for the three years under discussion. This seems more possible of attainment, as noted below. The increase in 1971 of about 7,000 registrants in the seventh grade must have cost the Min/Ed close to ¢2 million, a part payment of the enrollment expansion cost of Reform/ITV.

As before these budget outlays may well be reduced by a further element. Sixth grade graduates in future years, growing in number, will take up such slack in student-teacher ratios as still exists and enable the system to run in double sessions. In this light recalling the savings latent in such developments, the above cost estimates of our second junior high school target may be scalled down considerably--they may even be slashed in half.

The capital expenditure side of the equation also looks promising. AID Loan 014 will help construct approximately 300 third-cycle classrooms which, subject to double sessions, can accommodate 24,000 new students. Night sessions would further extend the number.

The price tag for this scaled-down target, if related to the total Min/Ed budget, amounts to a 1-to-2 percent surcharge, nothing to get worried about. Yet a later point may merit a preview here. A more economical way of utilizing

ITV than now in force--abandoning the "teacher standby mode" at the Plan Basic level--would permit cutting the input of new teachers required to meet the above goal and make it possible to improve ITV's scope of enrollment.

Savings from Lower Repetition Rates

One possible future cost advantage of Reform/ITV, when pitted against traditional ways, is to cut the number of repeaters. That saving could be substantial. Interest continues in El Salvador over the possibility of automatic passing, but as of this writing the idea remains in the talking stage. Some clarification and statement of assumptions may be beneficial to put the argument on a firm basis.

Automatic passing may occur under various circumstances and cover a multitude of sins. Cases are known in former colonial areas where examination standards were set so high as to flunk an excessive number of pupils. The mere elimination of such examinations then becomes tantamount to automatic passing.

In other situations the learning objectives are realistic but instruction is so deficient as to produce high failure rates. Automatic passing here means an acquiescence in low or lower scholastic standards.

The possibility examined in this report differs from the above. Our premise is that Reform/ITV may lead to learning improvements of sufficient magnitude so that, without down-grading reasonable performance standards, more students will pass and fewer will repeat their grade. Only on these conditions can a saving due to lower repetition rates be counted as a benefit of Reform/ITV.

While budget savings due to fewer repeated years are the same no matter what the root causes, here we are interested only in efficiency improvements, not in token reductions in outlays that are achieved by down-grading standards. In the latter case, the cost reductions correspond to cuts in learning output and hence leave the cost-benefit equation more or less unchanged.

The premise of the following estimates of cost savings is that the elimination of repeaters creates vacancies which can accommodate students at no additional provision, if unmet demand exists, for teachers and classrooms. Budget savings under the stated conditions would be proportional. The model requires some supplementary technical explanations and certain assumptions which are set out in Appendix IV.

Two approaches may serve to quantify these savings. We may estimate the amount saved at selected dates by simply "wishing repeaters away". This shows what the system and the budget would look like without repeaters. Another method, covering a period that starts, say, with the effective date of the Reform/ITV-induced equivalent automatic passing, leads to somewhat different numerical results, as follows.

First, the act of repeating produces a queuing effect on the flow of students through a school system, largely reflected in the typical "narrowing staircase" pattern of enrollment by grades (and this quite apart from the influence of desertion). Second, relieving the system of repetition will have a modest impact in the first year, since only "would-be-repeaters" in the terminal grade would exit immediately into the outside world. The rest, who stayed within the system, would simply accelerate their progression from grade to grade, unless they chose to quit before graduation. The system would not be fully purged of erstwhile repeaters--now undistinguishable from their non-repeating fellows--for a period equal to the number of grades it contained. These conclusions may be easily demonstrated on the basis of a two-grade model, with a constant student influx and, for the first grade only, a steady repetition rate for new entrants. Stable repetition rates for both grades would not change the results, nor would the addition of a third grade.

Our purpose, unlike that of planning officials, is not to detail the phased impact on enrollment, year by year, of a possibly dramatic cut in repeater rates. Let it be sufficient to acknowledge that such a policy would take time to work itself out, following the lines indicated by the second model. We proceed by accepting the first option and, as a feasible approximation, will cost out the absence of repeated grades in selected target years.

In 1970, the repeater rate in primary schools which we shall be using--both in the public and private sector--was about 18 percent for all grades combined. Parenthetically, this happens to be close to the rate of repetition of 20 percent for the synthetic 1964 cohort discussed above. This coincidence gives some substance to preliminary conclusions of other investigators: that the parameters of the enrollment matrix of El Salvador have remained remarkably constant in recent times.

We may therefore ask ourselves what the magnitude of the saving in student places would be if the system had been, or could in the future be cleansed--in one great sweep--of all its repeaters. To get an idea of intermediate effects--say, some midway point of any six-year "purging period"--we also calculated possible enrollment reductions on the assumption that the repetition rate dropped to only 10 percent instead of zero (Table 3.4).

The financial benefits may be simply obtained by multiplying vacated student places by representative unit costs. (Table 3.5). These once more are maximal because of the known slack in the upper primary grades in rural areas. As noted earlier, just as the placement of "deficit-students" or drop-outs in low-density classrooms would occasion no extra cost, so expelling repeaters from them would produce no savings. Accordingly, the tabulation of cost reductions is split into two parts: the maximum obtainable savings, and for more realistic estimates, allowing for partly filled classrooms in localities of low demand, one half of maximum obtainable savings.

In 1971, on that basis, the Min/Ed could have saved itself as must as ₵8.3 million if repetition disappeared entirely, but more likely the figure would be close to one-half of this sum or ₵3.7 million. This is at an ₵86 annual per student cost, the lower end of the range computed for 1967-70, and very close to the calculated figure for 1971.

Suppose that some repeaters remained, but teaching efficiency improved sufficiently to lower the ratio from 18 percent down to 10 percent of the

TABLE 3.4

ESTIMATED REDUCTIONS IN PUBLIC PRIMARY SCHOOL ENROLLMENT THROUGH LOWER REPETITION RATES, 1971, 1975 and 1980

	Primary School Enrollment Based on Failure Rates of:			Enrollment Reductions Based on Failure Rates of:	
Year	Actual	10 Percent	Zero	10 percent	Zero
	(In thousands of students)			(In thousands of students)	
1971	540p	497	443	54	97
1975					
Low Estimate	680	626	558	54	122
High Estimate	720	662	590	58	130
1980					
Low Estimate	860	791	705	69	155
High Estimate	940	865	771	75	169

p - Preliminary

Note: A drop in the actual failure rate of 18 percent in 1970 to an estimated 10 percent is taken as equivalent at a drop in enrollment of eight percent. Similarly, zero failures would represent an enrollment reduction by the full 18 percent.

Sources: Appendix Table A-2.2; Ministry of Education.

TABLE 3.5

ESTIMATED BUDGET EFFECT OF REDUCING REPETITION RATES IN PUBLIC PRIMARY SCHOOLS 1971, 1975 and 1980

(In millions of colones)

	Assuming Failure Rate of 10 Percent and Operating Cost per Student of:		Assuming Failure Rate of Zero and Operating Cost per Student of:	
Year	Low = ¢ 86[1]	High = ¢ 94	Low = ¢ 86	High = ¢ 94
		A. Maximum Savings Estimates [2]		
1971	¢ 3.7	¢ 4.0	¢ 8.3	¢ 9.1
1975--Low Estimate	4.6	5.1	10.5	11.5
High Estimate	5.0	5.5	11.2	12.2
1980--Low Estimate	5.9	6.5	13.3	14.6
High Estimate	6.5	7.1	14.5	15.9
		B. 50 Percent of Maximum Savings Estimates [3]		
1971	¢ 1.8	¢ 2.0	¢ 4.1	¢ 4.5
1975--Low Estimate	2.3	2.5	5.2	5.7
High Estimate	2.5	2.7	5.6	6.1
1980--Low Estimate	2.9	3.2	6.6	7.3
High Estimate	3.2	3.5	7.2	7.9

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[1] Highs and lows of operating cost per student, 1967-70, as used in enrollment estimates of Part II. In 1971, the estimated unit cost was ¢ 85.

[2] Maximum saving assumes all vacancies due to lower repetition to be filled by unmet demand.

[3] Assumes that only 50 percent of all vacancies would be filled the rest of student places remaining empty.

Source :Table 3.4

student body. Savings in 1971, correspondingly, would then reach only ₡4.1 million or, in the more conservative case, ₡1.8 million.

Similar computations using the higher unit cost of the 1967-70 range, or ₡94, are also given although these are more justifiably applied to future years.

With a larger student body and higher unit costs in 1975 and 1980, but the same enrollment structure and 18 percent repeaters, the potential for savings from automatic or "semi-automatic" passing would be considerably larger, as would be expected. Depending on which estimate of future admissions and which combination of unit cost and classroom vacancies used, savings in 1975 would range from ₡2.3 million in the most unfavorable case to ₡12.2 million for a mix of zero repetition, ₡94 unit cost and full room occupancy. For 1980, comparable savings would run from ₡2.9 million to ₡15.9 million.

The magnitude of even the more modest sums in 1971 could comfortably cover the entire cost of ITV that year, with depreciation of equipment at the higher Santa Tecla rates thrown in. The primary teacher retraining program via ITV would thus be "costless" in the sense of leaving the budget unchanged. These budget savings, by the way, are annual and repetitive; they will continue as long as the conditions underlying our reasoning are fulfilled.

The savings in investment in a "no-or-low" repetition system can be approximated two ways. We may divide the number of eliminated repeaters by 240--the full student complement of a modular "3-3-6" school--and multiply the quotient by ₡25,400, the typical 1971 building cost per school. We can alternatively multiply the reduction in repeaters directly by ₡1,060, the construction cost of housing one student in a "3-3-6" school.

For example, in 1971, the number of desks that would be vacated if repetition were either diminished by 10 percent or stopped outright would be equivalent to 220 schools in the one case and 400 schools in the other. These are modular schools that could be stricken from future building programs, conceivably saving as much as ₡5.6 million, or even ₡10.0 million for zero repetition.

Once more these are maximum figures. Slicing them in half, we would still have ₡2.8 million and ₡5.0 million left over in our capital budget if it was based on the old repetition rates. Because of the longevity of school buildings these figures should be considered one-time savings in investment, realized in step with the possibility that passing a grade becomes more assured.

As repetition is discouraged or eliminated entirely, intergrade retention may rise if school-goers feel more optimistic about their ability to stay and graduate. The question has been asked whether the bill for this rise in retention would not largely cancel out any savings from lower repetition. At a first reaction, we simply do not know to what degree desertion is linked to repetition. Some published data exist, confirmed by common knowledge, that dropping out between grades is closely related to "lock-out" conditions in rural areas, and within a grade to the need to work in the fields, to migration, to sickness and to a host of other social factors.

Some emphasis should be given to the fact that passing a grade in El Salvador makes continuation in the next grade anything but certain. On the contrary, in recent years well over one-half of all primary students who passed their final examinations failed to go on. The intergrade dropout rate of passing students was highest in the upper grades and, counter to expectation, the urban schools exceeded the rural ones in this respect. This should correct any false notion that passing and retention might be equivalents or that former repeaters would thereby be converted into retainees.

The functional relationship of changes in intragrade desertion and repetition of that grade to budget effects is discussed in Appendix V.

The question about the likelihood of greater retention eliminating any savings from lower repetition, where the implied relationship may hold, contains a certain misapprehension. Obviously if students who formerly might have deserted now stay on, encouraged by easier passing, the budget would probably have to rise. But the lower repetition effect and the higher retention effect, traceable to better learning and easier passing, confront us with two entirely different phenomena with regard to cost-benefit calculations.

The bill for retainees--for additional future primary school graduates--represents a payment for an increase in educational output, actually a reduction in the scholastic "deficit". System efficiency remains unchanged even though volume rises. Savings due to cutting out repeaters, by contrast, mean chopping costs without reducing output in any material way. The first case constitutes an expansion of both system load and costs, whereas the second case, for a given graduate output, brings about a measurable improvement, grade by grade, in systems efficiency as measured by unit cost.

From a cost-benefit standpoint, the two events are neither commensurate nor analytically additive. Conventional accounting, of course, merely looks at the cash flow, recognizing a plus in the first instance and a minus in the second, and nets the two against each other to derive their joint effect on the budget. In this respect, bookkeeping and analysis are at opposite poles.

The proper manner of looking at this joint transaction is to assume that the savings from automatic passing would be reinvested to help cover the educational deficit. The savings are still in existence; the process of putting them to work does not diminish them. After all, savings do not have to accumulate in a mattress to remain intact. Indeed if the saver expects them to yield any kind of financial return they must be invested.

Television in the Mix of Instructional Media: Comparative Costs

Overview

Of rather fundamental importance in any cost study of ITV is the cost of alternative media. Certain possibilities for making substitutions at the margin of use of any teaching instrument exist. Where effectiveness can be shown to be on a par, the more economical medium will tend to be chosen.

The basis of such a comparison of media must be appropriate unit cost. Apart from programs, dealt with earlier, a great variety of other unit bases are available, from student-place to class-hour. Similarly, several categories of expenditure can serve as the numerator like operations, transmission and reception. These various components of ITV outlays respond in different ways to changes in program output and size of audience and deserve to be dealt with separately. Prior to such detailed analysis, however, it may be helpful to look at the structure of the unit cost picture.

As for annual operating costs of the ITV system, these drop from ₡365 to ₡25 per student as the audience grows from 2,000 in 1969 to an estimated 40,000 viewers in 1972 (Table 3.6). If all the 60,000 students expected to be enrolled in public junior high school in 1973 could be covered by the system, the annual unit cost would decline still further to ₡16 per viewer. These costs include not only the program itself, but also the preparation of student workbooks and teacher's guides. The printing and distribution of these materials, however, is excluded; this expense has been met by the patronatos, the rough equivalent of parent-teacher associations.

TABLE 3.6

Annual Operating and Capital Costs of ITV Per Student, 1969-72

(In colones)

Item	1969	1970	1971	1972
Annual Operating Costs				
(1) Cost of ITV Programming 1/	¢ 730,000	¢ 860,000	¢ 970,000 2/	¢ 990,000e
(2) Number of Students in Teleclasses	2,000	10,000	25,000	40,000e
(3) Annual Operating Cost per Student	¢ 365	¢ 86	¢ 39	¢ 25e
Annual Capital Costs				
(4) Annual Depreciation on Transmission Facilities (10-year life)	¢ 82,000	¢ 82,000	¢ 82,000	¢ 520,000
(5) Capital Cost of ITV per Student (4):(2)	¢ 41	¢ 8	¢ 3	¢ 13
(6) Annual Depreciation on Receiving Sets (5-year life)	¢ 7,000	¢ 27,000	¢ 27,000	¢ 77,000
(7) Receiver Cost per Student (6):(2)	¢ 3	¢ 3	¢ 1	¢ 2
Total Annual ITV Costs per Student	¢ 375	¢ 97	¢ 43	¢ 40
Annual Operating Cost Per Student at Public Junior High School	¢ 231e	¢ 240e	¢ 253e	¢ 260e

e - Estimated

1/ Includes transmission of videotapes.
2/ Total outlay prorated between ITV and special programs.

Sources: (1) Table 2.9
(2) Ministry of Education, ITV Department
(4) Table 2.11
(6) Table 2.12

Recurrent capital costs of ITV, as noted before, consist of depreciation of equipment and buildings. This expense during the original Stage I of the system--converted make-shift quarters in the Teachers College of San Andrés--was modest. As the television student body grew, this expense dropped from ₡41 per viewer in 1969 to ₡3 in 1971. The possible rise in 1972 to ₡13 may serve as a cue that the new Stage II installation in Santa Tecla will be underutilized unless additional programs are put on the air, serving larger audiences, so as to distribute overhead in better fashion. For 1972, El Salvador is opting for rural extension and primary teachers retraining programs to make use of any excess capacity and to fatten the transmission schedule. A decision to extend television to primary school children is still pending.

Receiving sets are the least important component of unit costs. At present rates of use, this expense comes out to about ₡2 per student annually. Since the depreciation of receivers, given a purchase price of ₡500 and a 5-year life, runs to ₡100 per year, this means a ratio of 50 students to one set. Double shifts should bring this unit cost down to ₡1 per year.

Combining the above three elements of unit costs, we obtain an annual per student cost of ₡375 in 1969, which by 1971 had been reduced by 90 percent to ₡43. This reveals the power of an expanded student clientele to reduce unit costs to tolerable proportions, a subject to be explored in some greater depth below.

As already discussed in connection with the budget for ITV, these unit costs exclude various minor items, mostly because the trouble of estimating them did not seem worthwhile in El Salvador. Some extended reference to them will be found at the end of this section on comparative unit costs.

Unit Costs in ITV Policy

Once unit costs are calculated, the next logical step is to try using them in an analytic way. For example, one type of unit cost, annual operating expense of ITV per student, was found to be ₡39 per viewer in 1971 (Table 3.6). By relating this figure to the average cost of putting a student through one year of junior high school, or ₡253, one arrives at an estimate that ITV "added on" 15 percent to the traditional unit cost.

But such a percentage figure, although quite serviceable in the present case could be misleading unless interpreted carefully. The average Plan Basico cost refers to all junior high school students in the public sector; the television cost relates to a quite different and considerably smaller population of students, namely only those presently provided with viewing opportunities in both public and private institutions.

A proper alignment of regular and ITV unit operating costs requires the same size of student body as the base of computation. A more meaningful ratio for the "add-on" cost would be obtained if substantially all grade 7-9 classrooms were equipped with receivers. Had that situation existed in 1971, about 39,000 students would have been viewers; the unit cost of ITV would then have been about ₡25; and the add-on surcharge would have amounted to only about 10 percentage points.

Even that situation would be hypothetical. Over one-tenth of the viewers in 1971 attended private schools, and hence played no part in determining the above-cited average cost in public Plan Basico classrooms. Also, total ITV costs cannot legitimately be compared with the junior high school program because the Min/Ed fails to charge for depreciation of buildings and equipment.

This report's aim was finding normative unit costs useful to policy-makers. For that purpose, the unit-cost most readily coming to mind, and the one most cogent for the present analysis--given the constraints of data availability--was the cost of the conventional teaching hour. Teacher salaries form the major traditional input in systematic schooling, thus offering a convenient foil against which to pit both costs and benefits of alternative instructional media.

It stands to reason that ITV, with its inherent characteristics of overhead costs, is extremely sensitive to volume: expensive in small doses, and ridiculously cheap per viewer for national audiences. In-between, logically has to exist a middle-ground--something like a "break-even point". Here, if we hold effectiveness constant, it costs just as much to deliver a certain lesson via television as by conventional classroom teaching. This break-even point, in practice, constitutes something like the "critical mass" of viewers that must be reached before ITV can begin to pay off.

The principle involved here is probably the key for cost-effective ITV in the near future. In seeking validation on the effectiveness to date, television as an additive, independent agent for producing greater learning has struck out, for reasons discussed later. Hence for the time being, the cost side must carry the burden of any claim for ITV's superiority over traditional media if any such proof is to be forthcoming soon.

To put the "break-even" point argument in the proper light, the proposition stressed here is that television should fight for its place on the line-up of information inputs--in or out of the classroom--a place where it can stand on its own feet and do its instructional best, normally without a teacher in attendance and possibly with only a student monitor to keep order.

What has to take place in general, many educators agree, is a reordering and reassignment of media to their most cost-effective role. A certain amount of substitution may well be desirable, which is a far different matter from any replacement of the teacher by any kind of machine. It is this fear of obsolescence by replacement which has turned many teachers into latter-day Luddites when it comes to the hardware of instructional technology.

Costwise, the only way to test the legitimacy of such a partial substitution of media is to compare two (or more) input patterns on the same unit basis. As noted above, this report chose the class-hour and the student-hour. This, of course, supposes a given teacher-classroom-student configuration.

As in any formal education system, in El Salvador this configuration changes from district to district, from school to school and from classroom to classroom. While any of an infinite set of possibilities lends itself to the kind of cost matching proposed here, only those are acceptable that reasonably meet El Salvador's realities. The choice fell on a 1-1-50 scheme of teacher-classroom-students because it reflects a typical loading pattern in early primary grades, in urban schools and, increasingly, in junior high schools as these fill up through waves of new entrants. For other configurations, of course, other "break-even" situations exist.

Unit Operating Costs

The average operating cost per viewing hour during a program's three-year life--the first and most important category--is ₡18 when 100 classes are watching during a given year. This is equivalent, at an average class size of 50, to an audience of 5,000 students (Table 3.7). The unit cost works out to 36c per student-hour. As the number of classes and the student audience grows, the cost per viewing hour drops dramatically until, at levels of 2,000 class sections and 100,000 students, the expense drops to 90c and 2c respectively. As long as there is slack on the transmitting schedule, and sending costs are minor, we need not worry whether the 5,000 students view the program all at once or on several occasions.

Let us now take a leap into the unknown, assume that the teleclass--in some here unspecified but existing, learning-effective fashion--is conducted with only a student monitor in charge, and compare its cost with that of a traditional classroom hour.

In 1971, in El Salvador, a typical teacher at the primary level made ₡2.50 an hour and at the secondary level ₡4.20 an hour. For ITV to come down to that unit cost, each program produced under the present San Andrés pattern would have to reach 720 classes and 430 classes per year respectively.

For primary schools this is well within the reach of possibility in all six grades. At the junior high school level in 1971, enrollment in the seventh grade came to about 19,000 students and in the ninth grade to about 9,000 students --somewhat less than what the break-even point calls for.

TABLE 3.7

COMPARATIVE OPERATING COST OF ITV: PROGRAM-HOUR AND TEACHER-CONTACT HOUR, 1971

A. Cost Per Program-Hour

(1) Based on 3-year life, 70 percent Revision and 1970 Costs ₡ 1,800

B. Cost of ITV-Hour Per Class and Per Student During 3-Year Program Life

Annual Tele-Audience		Hourly Cost	
No. of Class Sections	Enrollment 1/	Per Class Section	Per Student 1/
(2)	(3)	(4) = (1) ÷ (2)	(5) = (1) ÷ (3)
100	5,000	₡ 18.0	36c
200	10,000	9.0	18
500	25,000	3.6	7
1,000	50,000	1.8	4
2,000	100,000	.9	2
(*) 720	36,000	₡ 2.5	5c
(**) 430	21,500	4.2	8c

C. Cost Per Teacher-Contact Hour

School Level	Teacher Salary		Teaching Hours		Hourly Cost	
	Month	Year	Week 4/	9-Months 5/	Per Class	Per Student
Primary 2/	₡ 210	₡ 2,520	30	1,000	₡ 2.50	5c
Junior High 3/	₡ 350	₡ 4,200	30	1,000	₡ 4.20	8c

(*) Break-even point with conventional teacher-hour for primary school.
(**) Break-even point with conventional teacher-hour for junior high school.
1/ Assumes an average of 50 students per class.
2/ Class A, 4th Category; excludes minor fringe benefits.
3/ Full-time teacher, modal salary, excl. of minor fringe benefits.
4/ Legal Requirements, not actual teaching load observed in field.
5/ Estimate taking into account numerous holidays.

Source: Table 2.10; Ministry of Education, Ley de Salarios, 1971.

However, an important variable in this connection is class size, which at this level is more likely to average 40 students than the 50 students postulated in the illustration. Adjusting for this lower density would bring the number of classes to be covered by ITV, on a three-grade average, well within shooting range of the cited break-even point if at the same time more private schools could be added to the rolls of ITV customers.

To repeat, we are talking here merely about the cost aspect of some marginal substitution, leaving aside questions of pedagogical feasibility and assuming equal potential learning effects between two instructional modes, one more and one less labor-intensive.

Also worth noting, the higher the teacher salaries and conventional unit costs, and the more rapid their climb due to union-induced pay raises, the more attractive becomes the cost aspect of ITV as an instructional alternative. This, of course, is an old story in the development and growth of technology which helps to explain why it has gained ground in processes of production.

A word might be said about the unit costs per teacher-hour that appear in Table 3.7 because they seem to be in some conflict with the more inclusive unit costs found in Appendix II of this report. Taking the annual per-student cost in primary school, which was ₡85 in 1971, and dividing by 1,000 annual class-hours, we obtain 8.5c rather than the 5c shown above. An even greater discrepancy looms at the junior-high-school level, one of between 25c and 8c per unit costs derived from similar calculations.

In answer, as just noted, the lower costs shown here assume, for illustrative purposes, an average of 50 students in each class which is too high a density. For example, taking a more realistic average grade school class of 40 students we obtain 6.2c. Likewise, based on the low r average Plan Basico class size in 1969 of 30 students, the cost per teacher-contact hour would be raised to 14c, thereby narrowing the gap. As soon as new statistics on the number of third-cycle teachers for 1971 appear, a more accurate measurement of class size and hence of cost per student-hour can be made.

Beyond this factor, the lower costs shown here reflect strictly teachers' salaries, allowing nothing for fringes, administration or ancillary services at any level. It might also be recalled that the earlier unit costs, serving primarily as coefficients for base-line projections, were not unduly refined, on the theory that the hierarchy of the Min/Ed's programs would be essentially preserved unless shaken up by the winds of reform. Special programs for the handicapped, experimental schools and the incipient kindergarten activities, furthermore, were folded into primary education where corresponding age levels warranted this short-cut.

The large difference in unit costs at the secondary level, on the other hand, bears watching, indeed some looking into. It suggests a rather top-heavy administrative burden, unless the student-teacher ratio were in the neighborhood of an average of 20. This is not to be ruled out.

Unit Capital Costs

As a second step in obtaining total unit costs, depreciation must obviously be added to operating expenses which were unit-costed previously. The problem that confronts us again is the spreading of overhead, but this time on two levels.

First, depreciation must be distributed over the number of programs produced--the larger the volume of output, the less the surcharge of investment overhead to unit production cost (Table 3.8). At the current level of operations, or 900 program tapings a year, depreciation expense amounts to ₡91 per program for the San Andrés phase, but it will climb sharply to about ₡560 per program for the Santa Tecla phase. As a saving grace, unit depreciation promises to drop to ₡170 when 3,000 programs are taped annually, which is a volume that conceivably corresponds to an ITV coverage of all the nine grades of basic education, plus rural and teacher-training broadcasts.

Still, to obtain a total program cost as it stands right now, one would have to raise the production cost of ₡600, as averaged over a three-year program life, by ₡91 to ₡691. Again, this represents 20 minutes of viewing time plus preparation of related teaching materials. Current costs of broadcasting are also folded in. A similar total program cost at the Santa Tecla stage of ITV would run to ₡1,160 for the standard 20 minutes at present production volume.

The second stage of overhead distribution, by far the more significant one, involves additionally the number of classes or of students that are watching a given program. This is apart from the pace of studio output. Supposing an annual production of 900 programs, and an average of 1,000 classes served by a given lesson simultaneously--which is "within the ball-park" for a primary school audience--depreciation on a per-class basis would amount to about ₡1.74 per program-hour. This is still relatively high, considering that at this volume operating costs alone run to ₡1.80 per

TABLE 3.8

UNIT CAPITAL COSTS OF ITV IN EL SALVADOR

A. Total Annual Depreciation Costs

(1) San Andrés Stage	¢ 82,000
(2) Santa Tecla Stage	520,000

B. Annual Depreciation Per Program and Per Class: Santa Tecla Stage (2)

	Annual Program Output Level:		
	900	2,000	3,000
(3) Cost Per Std. Program (20-Min.) (2) ÷ (3)	¢ 580 1/	¢ 260	¢ 170
(4) Cost Per Program-Hour (3) x 3	¢1,740	¢ 780	¢ 510
C. Number of Classes Per Year:			
100	¢17.40	¢7.80	¢5.10
500	3.48	1.56	1.02
1,000	1.74	.78	.51
2,000	.87	.39	.25

1/ Cost per Standard Program, San Andrés Stage: (1): 900 or ¢91.

Source: Table 2.11.

program hour (Table 3.7). Total unit costs at this level, therefore, come to virtually twice unit operating costs.

As program output rose, say, to 3,000 tapings a year, the depreciation cost, at a 1,000-class audience, would drop to 51c and for 2,000 classes to 25c. Once more adding these capital costs to unit operating expenses, always for the corresponding program level and class audience, we obtain an hourly ITV cost per class of about ₵2.30 and ₵1.15 for the two cases respectively. The first unit cost is slightly below and the second less than one half of the tougher of the two "break-even points", that is, audience volume that must be exceeded to match the conventional teacher cost of ₵2.50 per teaching-hour at the primary level. Both of these composite unit costs are sharply below the ₵4.20 at junior high school.

Costs per student-hour or viewer-hour are obtained simply by dividing any of the class-hour costs in Table 3.8 by whatever average room occupancy one thinks convenient or practical--50, 25, or whatever.

A minor item might be mentioned in passing: extension of ITV into primary school broadcasting would require the installation of a third transmission channel. The investment would be one of about ₵125,000, a cost of no more than ₵13,000 annually over a ten-year amortization period.

In terms of receiving sets as an element of total unit costs, again using the class-hour as our basis, the cost of a receiver drops from 25c for two viewing-hours daily--a very low utilization--to 6c if the receiver is turned on eight hours a day (Table 3.9) No adjustment is made for the present

TABLE 3.9

UNIT COST OF TELEVISION RECEIVERS

Unit Cost Per Receiver-Hour 1/ Number of Daily Viewing Hours Per Day	Per Year 2/	Cost Per Class-Hour 3/
2	400	25c
4	800	12c
8	1,600	6c

1/ Based on ₡500 cost per receiver fully equipped with aerial, and ₡100 annual depreciation on five-year life.

2/ Based on estimated 200 days of school-year.

3/ Depreciation cost of ₡100 divided by annual viewing hours.

Source: Table 2.12; AID/ES, Education Division.

20-minute programming pattern which leaves the set dark for 40 minutes of a 60-minute clock-hour. Further, with an assumed school year of about 200 days, receivers under the above computation stand idle for over one-third of the calendar-year. Fuller use for other educational programs, of course, could bring the unit cost per class down further, but there might be offsets in tube life. Clearly, and that is the main point, the amounts of unit capital cost are so small that previous conclusions on unit costs are not disturbed when receivers are included in the calculations.

When we add depreciation of transmission and receiving equipment to our computations, the break-even point with the classroom teacher is raised (Table 3.10). At the junior high school, the break-even volume now becomes about 25,000 students and, for the primary grades, 50,000 students. To return to the 170,000 first-graders of 1971, the full unit-cost of an hour of ITV would now come to ₡1.01 if 900 programs were produced annually at the studio, as at present, and ₡0.73 if output could be boosted to 2,000 programs, a number more closely approaching the capacity of Stage II of the system. These costs are a good deal smaller than those of a conventional teaching hour.

Before closing this discussion, attention may be called again to some costs of an ITV system that in El Salvador were too small to warrant lengthy estimation, but that in other countries may mean major expenditures. One of these is the cost of a power supply, whether through transmission lines or storage batteries. In the present case, power lines were already in place; a great many of the schools--all of the new classrooms--were equipped with outlets; and the consumption of current is not a big item.

TABLE 3.10

Operating and Capital Cost Per Class Hour, ITV and Conventional Classroom Teaching: Two Volumes of Annual Program Output at Studio

Required Annual Tele-Audience		900-Program Output Per Year		2,000-Program Output Per Year	
Class Sections	Student Enrollment*	Hourly Cost: Per Section	Hourly Cost: Per Student	Hourly Cost: Per Section	Hourly Cost: Per Student
100	5,000	¢ 35.52	¢ 0.71	¢ 25.92	¢ 0.52
200	10,000	17.82	0.36	13.02	0.26
500	25,000	7.20	0.14	4.28	0.09
1000	50,000	3.66	0.07	2.70	0.05
2000	100,000	1.89	0.04	1.41	0.03

* Assumes average class size of 50 students.

Note: Figures include operating costs as shown in Table 3.7; annual depreciation of Stage II studio and transmission equipment, as shown in Table 3.8; and annual depreciation of receivers when used during an average of four hours daily, as shown in Table 3.9.

As for maintenance of equipment, downtime of sets was initially expected to be expensive, but experience proved this wrong: repairs have been at a minimum. Elsewhere, with different receiving equipment, the bill for repair crews, shops and spare parts may come high, perhaps at some saving in initial receiver costs.

An engineering crew to keep the transmission equipment in operation has been included in the rental of channels. Such people will go on a direct hire basis in the ITV Department once it moves to the new studios; actually some savings are expected from this shift.

The printing and distribution of workbooks and teacher guides--probably a product of ITV more than of Reform alone--is another expense not explicitly incorporated into the estimates. By way of comparison, paperback ROCAP textbooks are estimated to cost 20 centavos apiece in volume reprints. For the five subjects in the Reform/ITV curriculum, there may well be an annual printing cost per junior high school student of something like ₡1, assumed by the patronatos. The distribution of printed materials, now a once-a-year affair, is a joint cost with the transportation of school supplies prior to school opening; it is not an expense of major proportions. Again, this may not be so in another country.

While the roughly ₡4 million of start-up cost accumulated by 1973 were treated as part of the required investment, they were capitalized without annual amortization (Table 2.13). The possible unit cost, assuming a 40-year life and writing off the cost entirely against a junior high audience at the 40,000-student level, would amount to no more than ¢2.5 per student-year.

In other circumstances, these cost classifications may be of considerable weight in the computations of the cost model and warrant careful analysis.

More than ample allowance has been made for these omissions by a conservative accounting stance along the way: in program production costs, through the neglect of a 50-minute teaching hour and possible problem-solving breaks for viewers in future transmissions lasting longer than the standard 20 minutes of today; in the depreciation assumptions of transmission equipment; and in the rather ample costing of sets by assuming only four 20-minute "hours" of reception a day. The matter of interest on the capital investment of ITV is a topic discussed in Appendix III.

While El Salvador is propitious for the ITV experiment in view of its size, population density and geographical contours, one is perhaps justified in speculating about other countries: some perhaps larger in land area but with a resultant need for more repeater stations to give adequate coverage. Program costs per class or student might well drop to the vanishing point, but investment and its related amortization cost could rise; just how in proportion to the size of the audience is uncertain. One's best guess is that television may be cheaper still in countries that are larger, even if less densely settled than El Salvador.

Summary

El Salvador's ambitious plans to promote wider enrollment ranked first among desired improvements in system performance when the matter is studied for its direct cost impact. Two expansion targets of the Min/Ed were evaluated, one at the primary and the other at the secondary level. Calculations showed that a plan of retaining children generally through the sixth grade was an extremely expensive proposition, and so was a proposal to retain them all through the ninth grade.

By contrast, a goal of having all public sixth grade graduates complete the "third cycle" of public school was far more easily within the financial reach of the Ministry. Scrutiny of the newly introduced "3-3-6" system revealed a potential for considerable savings--of the order of one-third for operating costs and of one-half for classroom investment--assuming a standard-size, modular school running at its rated capacity. However, to know what cost reductions would amount to in practice, only an on-the-spot survey, school-by-school, could reveal with precision.

Appreciable scope for saving money appeared also in the possibility of accelerating student progress through the system by reducing or eliminating repetition. The situation was complex, however, because a conceivable concurrent rise in retention might boost spending. The net effect of these two countervailing factors might be a drop in the cost of producing a graduate and at the same time a rise in the total educational budget.

Ways of raising the cost-effectiveness of television occupy a key spot in this investigation. As one would expect, in recognition of the system's tremendous capacity of delivering information, the larger the audience the lower the unit cost. Economic logic argues for multiple uses of the facilities round the clock. Also, if ITV can match conventional teaching in some area of the curriculum with regard to effectiveness and cost, one might well advocate an admixture of "pure" television programming, with only monitors present, to the battery of available and often alternative instructional media.

Cost calculations showed that at an attainable volume of viewers for El Salvador, television programming without a stand-by teacher was equal to comparable operating costs of traditional classrooms. Beyond that "break-even" point audience, television rapidly became cheaper. Again, this is on the assumption that the suggested pattern of ITV use would be pedagogically feasible.

When we project multiple uses of the installation, we automatically spread fixed costs over a still larger volume of broadcasts. Adding now depreciation costs of transmitting and receiving equipment to operating expenses and putting this on a class-hour basis, we are still in an area that is favorable to ITV in the cost comparisons. Here the "break even" cost of ITV with the traditional class-hour is reached when about 1,000 class-sections watch a given program.

PART IV: BENEFITS OF REFORM/ITV

A glaring difference between costs and benefits is the definiteness of the one and the fuzziness of the other. Nowhere does this generality apply with greater force than in education. Costs are in plain sight, but final output--difficult to define, let alone measure--lacks a price-tag. The matter is not quite so desperate in the case of Reform/ITV in El Salvador, where we may probe for benefits along two lines: one, following capital budgeting procedures in business; and two, conducting a search along the horizontal time-axis of educational "production" processes.

The first search for benefits leads to an examination of revenues and costs of the educational system seen as a species of business enterprise. The second quest checks out benefits to the ultimate consumer of educational services, the student and his society.

A Businesslike Approach

Cost-benefiting educational reforms, one may reason, should follow the general pattern of capital budgeting in industry. This is characterized by at least two stages. First, given any project, the technical alternatives are weighed for a choice of the best one (least cost being the usual criterion). For an electric utility, a main choice lies among hydro and thermal plants; for a manufacturer, components are subject to "make-or-buy" decisions.

In phase two, the most efficient option must compete with similarly selected projects in other investment fields. The usual yardstick is the rate of return on investment or its present-value counterparts. A conglomerate corporation, expanding in various directions among its diversified activities, may jettison the top candidate in an old-line textile branch in favor of the newer, more rewarding health services.

The present discussion will concentrate on the first stage, competition or, better, cost comparisons among related techniques. The second stage is more problematic. Determining the return on investment to education compared, say, to that on water works, roads or industrial projects demands data difficult to come by in the United States, and virtually unobtainable in El Salvador. However, at least one cost-benefit study of a major littoral highway in that country has been conducted and more could and should probably be done.

Educational innovations, and particularly ITV, may distinguish themselves from alternative modes by demonstrating, or failing to do so, some specific advantages or benefits. These are private benefits to the extent that they accrue to the individual, particularly if they come in tangible form: and they are public to the degree that, being incapable of private appropriation, they accrue to the community at large.

In general, economic benefits of a project come in a variety of guises:

(1) An increase in income or revenue which signifies, given costs, a rise in net income.

(2) A cost saving that is also equivalent, given revenue, to an increase in net income.

(3) A payoff, or the cost difference between two alternatives, one of which happens to be unacceptable, say, due to insufficient funds. Supposing that the next best alternative did not carry such budgetary constraints, the cost difference between the options would then be a clear saving, not a payoff value, for the victor.

An alternative exists if technically feasible, even though it might be turned down for any number of reasons, such as price tag, on social grounds, for political expediency or whatever. The rejected alternative, while out of the running at least for the time being, may still legitimately serve as a benchmark against which to measure the cost advantage, if any, of the accepted option. The only caveat is to avoid setting up an unrealistic alternative as a mere strawman.

These definitions have significant applications in the costing of ITV as a self-contained system in the public domain. National accounting principles stipulate that any government service not sold in the open market is to be valued at input cost, so that--net income being ruled out--only benefits (2) and (3), or savings and payoffs, apply. Should ITV prove to be the only feasible way of accomplishing an objective, because no other system provided the required information on time, we would also have a kind of payoff. In this instance, however, the payoff would be noncommensurable in money terms, and nonquantifiable unless a price could be put on early delivery of the communication.

The sequence of sections has been arranged to deal first with the savings and payoffs of ITV as a competitor with conventional modes used in teacher training, rural extension courses and school equivalency programs; and second with the benefits accruing to students and the national community.

Present and Expected Add-Ons and Payoffs of ITV

The point has already been made that television is unlikely to save money unless it can lead to less labor-intensive methods of instruction. To date, ITV in El Salvador has been for the most part--some people would say entirely--an additional cost of the education system. There is no ignoring the fact that a television receiver side-by-side with the classroom teacher is not going to reduce costs although, apart from some changes in the instructional input mix, one of two things may help produce such a result:

(a) fewer repeaters; or

(b) student acceleration, because they learn their lessons better and faster.

Every such instance may mean another school-year and student-place saved. The possible cost effect of a sharp reduction in repeaters has already been dealt with in the section on efficiency improvements. At this point. we refer to the possibility of lessened frequency of repetition through improved learning via Reform/ITV and not on account of such procedural changes as automatic passing.

Acceleration of studies means the mastery of a given body of knowledge in less time, leading perhaps to a reduction from the present nine school-years to only eight. Such a possibility has in fact been raised extra-officially. If television were responsible in whole or in part, the cost saving inherent in a foreshortened school-career would clearly belong under the head of benefits.

Any diminution of drop-outs due to Reform/ITV would surely have to be counted as a benefit as well. But, as shown in a previous section, keeping deserters in the system, say, to graduation from the sixth grade, is not going to save the Min/Ed any money--quite the contrary would happen.

To reiterate, outcomes of the kind enumerated above have been shown to derive from the impact of reform, but so far they have not been traceable to the use of television as a separate factor, and while it is probably true that more spending on ITV may get us better values in education, this is not the same as saving money.

In these terms, television's role in the reformed Plan Basico program, with regard to student costs, has been an add-on. In other cases, however, ITV has been or may in the future be used in place of a more expensive medium. The retraining of teachers is an example discussed in a later section. Whether to call any such cost difference in favor of ITV a "saving", as people in the ITV Department propose, is debatable.

Assuming El Salvador had firmly decided to undertake a given educational program, and there were two feasible techniques--one with and the other one without the use of television--a true cash saving could be realized if the TV-less mode turned out to be cheaper. Unfortunately, in the various projects where the Minister of Education proposes to use ITV, the alternative, conventional and more expensive techniques are simply not within budget possibilities at this time. Either the outlay that would be required is so large that the program, if done traditionally, would bankrupt the Ministry; or the time element in reaching the educational objectives is so long that the program would never get off the ground soon enough to do much good. Rather than talk about savings, therefore, we propose to talk about payoffs: the cost difference by which ITV makes an educational activity--otherwise impossible to execute--feasible. The next best alternative, in other words, is too costly. These payoffs can be real enough and there is nothing wrong with putting a price tag on them. Thus quantified, the sum of these payoffs may be set against the costs of television. Simple subtraction would measure what we may call either the net cost or the payoff of ITV, depending on whether the gap is negative or positive in monetary values.

Within this framework, the exposition below will analyze the following ITV-assisted programs, realized or still on the drawing board as of mid-1971:

- "Add-On": The Plan Basico Curriculum
- "Payoffs": The Retraining of Teachers for the Plan Basico
- The Retraining of Primary Teachers for Reform
- A Rural Education or Primary School Catch-Up Campaign

The Cost of Television in the Plan Basico

The crux of reform in the three junior high school grades was the introduction of a new curriculum. Theoretically, its content could have been implanted without the aid of television or, for that matter, without a retraining of teachers.

The concept of a renovated educational system, however, as it emerged from the thinking and extended discussions within the Ministry of Education and its technical advisors, came to mean more than just a reshuffling of "flash cards" or, changing the metaphor, pouring new wine into old bottles. New containers were what was wanted.

The introduction of ITV into the new Plan Basico therefore went hand-in-hand with a fresh approach to the classroom and new teaching materials to fit it. As described in detail in other writings of AID's "El Salvador team", the emphasis switched from rote learning, monologues, and an autocratic posture by the teacher to motivation, definition of behavioral and cognitive objectives, the specification of learning activities, and class participation.

This does not mean that these innovations were wholly tailored to fit ITV, to rise and fall with its outcomes. The curriculum planners were almost wholly divorced from ITV operations, their task being conceived as being one in its own right and not beholden to any specific medium.

The role assigned to television in this system was not only stellar but one integral to the play. From the standpoint of function, it makes no more sense to ask about the cost of the reformed Plan Basico with and without the option of television than to ask about the cost of putting on a production of Shaw's "Pygmalion" adding or deleting the role of Professor Higgins: it would not be the same play--in fact, no play at all.

The accountant, however, operates within a discipline that makes almost any kind of cost separation possible. One might very well conceive of an alternative Plan Basico reform, leaning on the use of radio instead of television. The difference in cost could easily, and perfectly rationally, be determined.

In this spirit, it is possible to answer questions about the separate cost of television in reforming instruction at the Plan Basico level. We can put this cost equal to the production expenses of the required program packages during the period of 1969-71, adding an allowance of capital depreciation (Table 4.1). The year 1972 has been estimated as well, so as to extend the calculation to the end of the Minister of Education's first Five-Year Plan. The total sum comes to about ¢4.0 million, which works out to ¢50 per student for an audience of roughly 80,000 during this period. This is a four-year average, heavily weighted by the start-up years. By 1972 the annual per student cost is likely to be half as much or close to the current cost of ¢25 at the 40,000 viewer level (Table 2.9).

It makes no sense to charge the early start-up expenses incurred by ITV, total or in part, to Plan Basico teaching. There is, after all, a big difference between what has been spent on television, investment and all, and the cost of any one specific program. The two should not be confused.

TABLE 4.1

Operating and Recurrent Capital Costs of ITV in Plan Basico Programs 1969-1972

Item	Amount
A. Costs Paid for by GOES	
(1) Program Production, 1969-71 [1]	¢2,560 M
(2) Program Production, 1972 (Estimated)	990 M
Subtotal	¢3,550 M
(3) Depreciation of Receivers, Loan 013 [2]	50 M
Subtotal	¢3,600 M
B. Costs Paid for by AID Grant	
(4) Depreciation of Equipment, 1969-72 [3]	328 M
(5) Depreciation of Receivers, 1969-72 [4]	108 M
Subtotal	¢ 436 M
C. Total Operating and Recurring Capital Costs Plan Basico Instruction	¢4,036 M

Note: Depreciation was not prorated to allow for minor incidence of special programs on Plan Basico costs. Start-up costs excluded.

1/ Table 2.9 C(7).

2/ Applies to 1972.

3/ Table 2.11 Stage I - San Andrés (4 years).

4/ Table 2.12.

The above estimate does not include any part of the expense of the new Santa Tecla installation because this facility will not become operational until nearly the end of the 1972 school-term. Nevertheless, the detail of capital costs in Table 2.11 should be adequate to let the user of this report make his own accounting adjustments if he wishes to do so.

In accounting language, the utilization of ITV in the Plan Basico program was an "add-on" cost. Not for a minute, while the receiver was on, did the teacher abandon his place in the classroom. The input design for television-assisted instruction called for ten minutes of introduction by the teacher; a twenty-minute program while the teacher usually stood by and observed; and another twenty minutes of discussion based on the telelecture. Whether this is the ideal, the necessary or the future Salvadoran pattern of employing ITV for maximum effectiveness is not within the province of this study. From a simple cost standpoint, however, it is a calamity because it destroys any possibility of substitution within the mix of input media, a process that is at the heart of the economics of production, educational or otherwise. More will be said on this point in later connections.

The Retraining of Teachers for the Plan Basico

To put the revamped Plan Basico curriculum "on-stream," teachers were assigned a central part and were to be properly trained for the purpose, ultimately with the aid of ITV. This is not a contradiction in terms.

The idea of displacing the teacher in his classroom by an impersonal communications medium is nonsense. The small band of autodidacts who pursue selected fields of study entirely on their own are the exception that proves the rule. On the other hand, ITV can serve as an economical or, better, a cost-effective substitute for certain teaching transactions. It can also aid the teacher in his job and relieve him of routine, like the almost debasing straight lecture; and it can help teach the teacher himself. The last aspect is what concerns us here.

In 1968, a lack of qualified teachers at the secondary level was one of the toughest bottlenecks facing expansion of the junior high school, one of the main targets of reform. Only one-fifth of such people were duly prepared for their tasks, the rest being a mix of provisionals and patronage appointees. Trained graduates of the Advanced Teachers College, the Normal Superior, and of the National University were a drop in the bucket.

Instead of just firing unqualified personnel, the decision was made at the top to utilize the plant at San Andrés which had stood virtually idle since the closing of primary teachers colleges to stop "over-production" for the purpose of training the roughly 900 secondary teachers thought to be needed for the reform. Those failing to adapt themselves would be sent back to teach in the first six grades.

The time frame in which this project was to unroll was three years. In fact, four groups of teachers were trained, the first group taking a series of three vacation courses of three months duration that started in the Fall of 1968, while the rest enrolled in courses lasting nine months of a school year. Trainees were paid their normal salaries while attending the Ciudad Normal "Alberto Masferrer"--to give the Teachers College at San Andrés its proper name--and substitutes were hired to replace them in their home classrooms.

This implied a one-year cost for the full retraining program. Further needed in-service training, so the thinking went, would be provided by subsequent participation in the reformed classroom, aided by teacher's guides, work-books and--where receivers existed--the example set by the television teacher. Thus, as it turned out, the output of the television studio fed directly into the training project to extend its operation and effectiveness over two years.

Here for the first time we encounter a situation where ITV presents an alternative to another, more old-fashioned way of doing things--training junior high school teachers in a two-year course at the Normal Superior as relocated at San Andrés. This possibility is not just fantasy: the 1968 budget projected by the Ciudad Normal at the end of 1967--but never executed--planned for the reception of at least 700 student-teachers, both primary and secondary. It was the time factor that principally stood in the way of this option, a delay of two years before the first graduates for the new Plan Basico could be turned out.

Quite reasonably, the policy-makers in the Ministry of Education and the ITV Department take much pride in accomplishing the retraining job in one year instead of two. More to the point for this report, they believe that ITV has produced a real "savings" and hence begun to pay for itself.

Nevertheless, we will refer to the difference between the two training alternatives as a "payoff", to avoid any insinuation that one of the two is unreal--a strawman set up to make ITV look good.

The conventional cost for a two-year course at the Normal Superior consists of tuition, lunch, and--for a majority of students--full room and board. The unit cost is somewhat difficult to set down because it fluctuates wildly, depending on the degree to which the plant in San Andrés is utilized. In 1968, the projected cost per student was ₡1,600; in 1969, with only 260 students in attendance, the unit cost was ₡3,200; and in 1970, with a fairly full complement of trainees of various kinds, the cost per equivalent full-time student was computed to be ₡1,950. For comparative purposes, the last specially derived figure seemed a reliable one to use as a norm. Thus, the bill for training roughly 1,200 teachers at San Andrés for the reformed Plan Basico between 1968 and 1972, comes to ₡4.5 million (Table 4.2). These costs, incidentally, do not include any allowance for depreciation of the buildings at San Andrés, since such a figure proved impossible to obtain. Maintenance, of course, is part of the operating budget.

In addition, circumstances being what they were in 1968, these teacher trainees would have had to be paid standard salaries, at a cost of ₡3,000 per student, exclusive of fringes. This represents an expense of about ₡7.0 million for a two-year cycle. The total for conventional training, therefore, comes to ₡11.4 million.

Under the ITV-assisted mode, taking advantage of in-service training opportunities provided by a systems-oriented approach, training time and

TABLE 4.2

COMPARATIVE COSTS OF TRAINING PLAN BASICO TEACHERS: TRADITIONAL PATTERN AND ITV SYSTEM

A. Number of Teachers Enrolled 1/	1,153
B. Traditional Pattern: Two Years of Study	
(1) Training Costs, Normal School (₡3,900 per student) 2/	₡ 4,500 M
(2) Salaries paid Trainees (₡3,000 per student) 3/	6,920 M
(3) Total Cost 4/	₡11,420 M
C. Reformed Pattern Under ITV System: One Year of Study	
(4) Approximately one-half of B (3)	₡ 5,710 M
D. "Savings" or Payoff under ITV, 1968-72	₡ 5,710 M

1/ Schedule of Enrollments:

	Number of Students
3-Month Summer Courses during 3 years:	
1968-70	100
1970-72	153
9-Month Regular Courses:	
1969	265
1970	236
1971	199
1972 (Estimated)	200
Total	1,153

2/ Based on 1970 average cost of ₡1,950 per full-time equivalent student taking a 9-month course at the Normal School at San Andres.

3/ ₡250 per month on a 12-month basis.

4/ ROCAP and other textbooks, a minor expense, are not included.

Source: Ciudad Normal "A. Masferrer"; Ministry of Education, Department of Supervision.

expenses are cut precisely in half. These deliberations justify a statement that ITV permitted the selection of a training alternative that was ₡5.7 million cheaper, and provided a corresponding payoff. This payoff, incidentally is equal to roughly 41 percent of all the money spent on ITV by the end of 1971 and 35 percent if we include an estimate for 1972.

The standpoint taken in the Plan Basico retraining program was to view its cost on an incremental basis, assuming the prior existence of a television installation with spare capacity. We had to take into account that teacher retraining occasioned no additional program production or transmissions on which to prorate costs. Consequently, in the present calculations, current, capital and start-up expenses of the ITV system were assigned an opportunity price of zero.

This procedure is common in capital budgeting when a prospective decision must be made on whether or not to add a new product or activity where available plant and equipment have excess capacity. For simple accounting purposes, of course, fixed costs might well be spread proportionately over all outputs. Each approach has its specific use.

The final step in the appraisal of individual uses of ITV was to be a comparison of payoffs and costs. If we had burdened the retraining project with part of regular ITV expenses, we would have reduced its _payoff_ advantage as well as the _bill_ for the Plan Basico program by the _same_ amount. No change in conclusions would have resulted from the alternative procedure.

The argument has been raised that, if a teacher in his first year of working in an ITV-assisted classroom is benefitting from additional training, as we claimed above, then part of his salary should be considered an in-service training expense and added to the cost of the ITV model. There is merit in this idea under highly formalized practice teaching systems such as are found in the United States and European countries. In the Salvadoran context, the output of a Plan Basico teacher after one year of study under the more intensive Reform/ITV curriculum and work materials may be considered the equivalent of the performance of a traditional teacher, with his standard two-year training behind him. Implicitly we are raising here, without wishing to answer, the issue of whether the previous longer preparation to teach at the junior high school level was really necessary. All such personnel, incidentally, are first trained to be primary teachers.

Another factor that had a bearing on our omission of in-service training costs is that the Min/Ed provides no additional formal training input whatever for the new junior high school teacher during his first year out in the classroom. The arbitrary assignment of part of first-year salary cost to training, therefore, would constitute a rather gratuitous imputation.

Some foreign advisors have been urging the Minister of Education to lengthen the years of study required before a teacher's certificate would be granted. In the light of the foregoing, El Salvador is more likely to go in the opposite direction. Under a new "tuition-loan" plan, prospective teachers will have to borrow money for their training, which would make the recommended rise in "professionalization" extremely expensive for them.

The Normal Permanente and ITV

An important program in which ITV has an excellent chance of a payoff is the retraining of primary school teachers. The Reform, as explained before, started at the junior-high-school level where it was implanted from curriculum on down to the classroom. The preparation of grade school teachers for instruction at the reformed secondary level was a vital part of the plan.

The primary level itself, however, remains largely untouched by change. True, a new curriculum for the six primary grades has been published, but it has yet to be translated into action. Some sporadic efforts were made to innovate as a result of orders from the Ministry to substitute the "new math" for the old. A modicum of back-up was given to this order through programs televised on Saturday mornings, but how many teachers actually watched and what those who did learned is uncertain. Resistance was reported by teachers who considered the Ministry's order too brusque and the training being offered inadequate.

Apart from such isolated episodes, life in the primary schoolhouse goes on much as before, with its shortcomings so amply and aptly described in other publications of AID's "El Salvador team".

General agreement reigns that educational reform without first reforming the teacher is doomed. Accordingly, thought about changing the pattern of primary instruction must quickly turn to, indeed center on, a program of teacher retraining. While this activity has not begun as yet in any organized fashion, a policy decision to do so is not in doubt. The concept, as far as it has jelled, calls for special programs to be televised on Saturdays, two or three hours in length, and combined with appropriate printed materials. The planning has not gone much further than this detail. For instance, the location of the receivers for roughly 15,000 primary teachers has not been spelled out. Obviously, there are some receivers in junior-high-schools already. Private families, including those of teachers themselves, have sets that might be made available in a community since there is no commercial broadcasting on Saturday mornings. The question of monitors also is unresolved: perhaps teachers will be the first group to be instructed by the screen without the physical presence of an instructor. Supervision, evaluation and quality control are all yet to be specified.

A judgment has already been made that this training plan, rough as its outlines may be, is feasible and that ITV is the way to do it. On that supposition, the television people are not averse to try demonstrating that the ITV mode is superior--productively and economically--over competitive, conventional means. An intellectually honest observer, therefore, must be doubly on his guard in making a comparison of this kind and, if in doubt, stack the cards against the desired outcomes. This posture will be observed here and in similar expositions to follow.

A starting point for defining what we mean by a traditional teacher training effort is to refer to the program for Plan Basico teachers just described. In 1968, in fact, Ciudad Normal planned to accept over 200 primary teacher trainees, but the project was later cancelled. As will be recalled, the two major expenses of this mode are taking teachers out of the classroom and paying them their salaries, while they study plus room and board at San Andrés.

In order to keep the number of class-hours between the conventional scheme and a three-year television campaign for primary teachers comparatively equal, their stay at Ciudad Normal was cut down from nine to three months (Table 4.3). The cost difference from the ITV approach, based on program requirements and corresponding unit costs, is still very great--although less than the ₡78 million for the nine-month course--and of the order of ₡18 million. If effectiveness of training could be guaranteed to be at least equal, this would be a payoff going a long way to justify choosing the television route in El Salvador.

Lest any misunderstanding arise over the time frame involved, it is not suggested that a traditional training scheme, if decided upon, would simultaneously tackle thousands of primary teachers at one time. The program obviously would have to be broken down into more digestable phases and the cost spread out over many successive years.

On the negative side, supervision is more of a problem with ITV than with conventional teacher training. That is to be admitted. Teachers may prefer other activities on Saturday morning, if left to their own devices, to watching television lessons and doing exercises. Examinations will probably become a factor in raises and promotions. There would be some expenses connected with these tests. The regular school supervisors, too, should probably be encouraged, if not required, to participate in these weekend sessions and work-shops as part of their duties; this would contribute a certain amount of control.

TABLE 4.3

COMPARATIVE COSTS OF PRIMARY TEACHER RETRAINING (NORMAL PERMANENTE): TRADITIONAL MEANS AND ITV SYSTEM

A.	Basis: Enrollment Target	15,000
B.	Traditional Means: 9-Month Course	
(1)	Number of Class Hours (25 per week)	900
(2)	Training Costs, Normal School (¢1,950 per year) 1/	¢ 29,300 M
(3)	Salaries Paid Trainees (¢3,000 per student) 2/	45,000 M
(4)	Total Cost	¢ 74,300 M
C.	Traditional Means, 3-Months Course	
(5)	Number of Class Hours (25 per week)	300
(6)	Training Costs, Normal School (¢500 per student)	¢ 7,500 M
(7)	Salaries Paid Trainees (¢750 per student) 3/	11,300 M
(8)	Total Costs	¢ 18,800 M
D.	ITV System	
(9)	No. of Class Hours (3 per week, 9-month year)	108
(10)	No. of Standard 20-Min. Programs per Year (5 per Sat.) 4/	180
(11)	Program Production Costs per Year (¢1,000 each) 5/	¢ 180 M
(12)	No. of Class Hours, 3-Year Campaign (9) x 3	324
(13)	Program Costs, 3-Year Campaign (11) x 3	¢ 540 M
(14)	Depreciation Cost, San Andrés Basis (¢91/Program) x (10)	¢ 16 M
(15)	Total Recurring Costs, 3-Year Campaign, San Andrés Basis (13) + (14)	¢ 556 M
(16)	Depreciation Cost, Santa Tecla Basis (¢580 / Program) x (10)	¢ 104 M
(17)	Total Recurring Costs, 3-Year Campaign, Santa Tecla Basis (13) + (16)	¢ 644 M

1/ Cost per full-time equivalent student, 1970.

2/ Stipend of ¢250 per month, paid for 12 months including Nov.-Jan. vacation.

3/ One quarter of full-time costs.

4/ 5 programs of 20 Min. each to fill 3-hours of class for 36 Saturdays.

5/ Assumes one-year life.

If monitors were desired, there is more than enough spread in the costs of the two alternatives to permit hiring as many as 1,000 monitors at the rate of ₡50 per month. The bill of about ₡500,000 would hardly make a dent in the cost gap.

Another aspect that favors ITV, if well done, is the possibility of using the same teacher training program in other jurisdictions. Reportedly, neighbouring countries in Central America have expressed an interest in making use of a Salvadoran program and thus sharing the costs. This aspect, although not translated into any cost setoffs here, could eventually become a factor with which to reckon.

As in junior-high-school retraining, the question of imputing part of payroll expenses to the ITV program raises its head. Since the 300-odd training-hours involved are virtually on a par with those of a traditional three-month program, there might be some justification for adding some ₡11.5 million to the ITV costs, and thus reducing the cost differential from ₡18 million to something more modest like ₡7 million.

The difficulty in making such an imputation arises from two points. One, reportedly the supervisory regime over the teaching and advising hours spent in rural grammar schools has been rather relaxed, so that Saturday training sessions are [illegible] necessarily accompanied by any decline in classroom hours under Reform. Second, the normal permanente is designed to interlock with the new "3-3-6" pattern, which in its scheduling of classes is not easily comparable with the traditional ways. The realities of El Salvador seem to defy the routine application of imputed costs because of the loose nexus between financial inputs and classroom performance of teachers.

Finally, training 15,000 primary teachers for reformed curricula in the traditional way through "normal schools" like San Andrés would easily take a decade. Such a delay is unacceptable, quite apart from the previous cost considerations.

Rural Adult Education Through ITV

One of the more difficult problems for ITV and one which at first glance looks like a failure is the so-called rural education program expected to start in 1972. Objectives, media mix and organization are not as yet well spelled out, although a firm decision to engage in this activity has apparently been made. The need is there, and conceivably an overextended planning period and never ending search for more data might sap the will to get started.

Costing this sort of project is like a flight into the unknown, but there is pressure to come up with a serviceable estimate. Critics are invited to make improvements.

The central idea is not unfamiliar: to bring useful instruction to adults in rural areas who lack information on a great many subjects of immediate interest to their daily lives. These people, mostly farmers, are considered virtual "illiterates" in such fields as food preparation, personal hygiene, modern agricultural practices and tool use. An inability to read and write or to follow written instructions and fill out simple forms goes with this. Little known are legal rights or what public services may be available.

In the nature of the case, it seems logical to enlist ITV to do the job and be done with it, but in the context of this study one wants to know what it would cost to mount such a battle against ignorance by other means. On closer analysis, the program seems to call for the recruitment of numerous area specialists--something like the organization of an extension service in home economics, public health, agriculture, public administration and so forth. The most likely format would be a central training institute for extensionists, who in turn would instruct selected people in their zone as teachers at the community level. In other words, what surfaces is a three-stage teaching program, extended over the various specialties.

Leaving effectiveness aside for the moment, we may approach the job of comparing the costs of ITV and conventional means in two ways. One, we could establish as our yardstick a detailed plan of activities, focusing on the skills and the number of specialists required at all levels of our hierarchy, since payroll is bound to be the major expense in such a service operation. Lack of expertise in this branch of education, of applicable comparative experience elsewhere, and lack of appropriate Salvadoran data rendered this approach impossible.

A second basis of comparison is the presently existing adult education program, essentially designed to provide a sixth-grade education in three years. Two hour classes are conducted, five nights a week, by primary school teachers on overtime, paid ₡50 a month or ₡1.25 per hour for their effort.

The organization of this program seems to suffer from a severe case of staff-anemia at the top; one director and a supervisory group of eleven people are in charge of 750 teachers spread out all over the countryside. Back-up assistance, equally weak, consists of six people engaged in the preparation of teaching materials, while two people take care of "research, evaluation and statistics". Reportedly the curriculum is a hodge-podge. The program was cut back sharply not long ago because of doubts about its worth.

Still, from a pure cost point of view, with blinders about effectiveness, this night school program looks so cheap that even a fairly sizeable ITV campaign in the same target area would have difficulty competing. The annual unit cost for 25,000 people enrolled during 1971--these are not audited market data--was budgeted at only ₡27, which comes to 7¢ per student hour. The class size is about 33 students per "promoter".

The cost picture changes radically, however, when we put this adult education program on a comparable scale with our proposed ITV project. As a point of departure, we can compute the cost per class-hour, our uniform input base, finding it to be ₡2.35 (Table 4.4). For the 10,000 or 25,000 monitors that would be required by ITV, depending on the target audience, we substitute primary teachers who would each work the stipulated 210 hours per school-year.

Somehow we would have to reconcile this additional requirement for teaching hours with available teachers; reschedule the "3-3-6" pattern; and hire

TABLE 4.4

COMPARATIVE COSTS OF A RURAL EDUCATION CAMPAIGN: CONVENTIONAL MEANS AND ITV

I.	Projected Pattern, ITV Mode		
A.	Assumed Conditions		
(1)	Enrollment Target	200,000	500,000
(2)	Hours in School Year 1/	210	210
B.	Program Production Costs		
(3)	Number of Std. Programs Required: (2)x2 2/	420	420
(4)	Cost per Std. Program (2-Year Life): 3/	₡ 1,000	₡ 1,000
(5)	Annual Cost per Std. Program: (4):2	₡ 500	₡ 500
(6)	Total Annual Programming Costs: (3)x(5)	₡ 210M	₡ 210M
C.	Supervision Costs		
(7)	Number of Monitors Required: (1); :20 4/	10,000	25,000
(8)	Annual Cost per Monitor 5/	₡ 250	₡ 250
(9)	Total Annual Cost of Monitors	₡ 2.5M	₡ 6.3M
D.	Annual Operating Costs		
(10)	Sum of (6) + (9)	₡ 2.7M	₡ 6.5M
E.	Reception Costs		
(11)	Number of Television Sets Required 6/	10,000	10,000
(12)	Cost per Receiving Set, Complete	₡ 500	₡ 500
(13)	Required Investment in Receivers (11)x(12)	₡ 5.0M	₡ 12.5M
(14)	Annual Depreciation Cost of Sets (5-Year Life)	₡ 1.0M	₡ 2.5M
F.	Investment Costs, Studio and Plant 7/		
(15)	Depreciation Cost, San Andrés Basis: ₡91 x (3)/2	₡ 20,000	₡ 20,000
(16)	Depreciation Cost, Santa Tecla Basis: ₡580 x (3)/2	₡130,000	₡130,000

1/ Six hours weekly for 35 weeks of school year.

2/ One class hour assumed to require two 20-minute programs.

3/ Includes preparation of teacher's guide and student workbooks. No revision contemplated during 2-year life.

4/ Assumes an average of 20 students per class section.

5/ Based on stipend of about ₡25 per month for nine months.

6/ Equal to the number of class sections.

7/ Average depreciation cost per program over 2-year life, at conservative 900-program output level (Table 3.8).

TABLE 4.4 (Cont.)

COMPARATIVE COSTS OF A RURAL EDUCATION CAMPAIGN: CONVENTIONAL MEANS AND ITV

G. Total Cost of ITV System		
(17) San Andrés Basis, Incl. Receivers (10)+(14)+(15)	₡ 3.7M	₡ 9.0M
(18) San Andrés Basis, Excl. Receivers (10)+(15)	₡ 2.7M	₡ 6.5M
(19) Santa Tecla Basis, Incl. Receivers (10)+(14)+(16)	₡ 3.8M	₡ 9.1M
(20) Santa Tecla Basis, Excl. Receivers (10)+(16)	₡ 2.8M	₡ 6.6M
II. Conventional Pattern, Adult Education Program 8/		
A. Costs per Class Hour		
(21) Operating Budget for 1971	₡616,000	
(22) Number of Primary Teachers Participating	750	
(23) Number of Class Hours per Student per Year 9/	350	
(24) Total Number of Class Hours Provided per Year: (22) x (23)	260,000	
(25) Cost per Class Hour	₡ 2.35	
B. Assumed Conditions		
(26) Enrollment Target	200,000	500,000
(27) Hours in School Year	210	210
C. Adjustment for Comparability with ITV Mode		
(28) Class Hours Required 10/	2.1M	5.2M
(29) Operating Budget Required: (25) x (28)	₡ 4.5M	₡ 12.2M
III. Cost Differences per Year: ITV vs. Conventional System ("Payoffs")		
(30) San Andrés Basis, Incl. Receivers (29) - (17)	₡ 0.8M	₡ 3.2M
(31) San Andrés Basis, Excl. Receivers (29) - (18)	₡ 1.8M	₡ 5.7M
(32) Santa Tecla Basis, Incl. Receivers (29) - (19)	₡ 0.7M	₡ 3.1M
(33) Santa Tecla Basis, Excl. Receivers (29) - (20)	₡ 1.7M	₡ 5.6M

8/ Budget Code 1.03-029

9/ Ten hours per week for a 35-week school year

10/ Equal to 10,000 and 25,000 primary teachers required times 210 class-hours per year.

more staff. This is a logistics problem of some complexity although it is far from insoluble. Given Salvadoran social pressures for extra income, or just for a regular teaching job, a way would be found to match supply with demand.

This expansion would mean a rise from roughly 270,000 hours of adult teaching as presently produced in the traditional programs for a smaller student-body, to a required volume of 2.1 million class-hours. Multiplying hours by unit costs, we obtain a budget running to about ₡4.5 million for the more modest viewer target and ₡12.2 million for the more ambitious one. Administration, now diminutive in size, would almost surely have to expand to keep pace with the enlarged operation.

The bill for a similar rural education campaign in which ITV carried the main burden would come quite a bit lower. Again with 210 hours of instruction--we assume television programming of roughly the present "San Andres" quality--we arrive at a cost of ₡210,000, supposing that each program had a life of no more than two years. If, as expected, footage from existing motion pictures or an entire film could be spliced into the program, costs would be much lower. Again, the unit cost in this computation is that of a "package", including an allowance for the preparation of course plans, monitors' guides, and student work books. Only the printing and distribution of materials are excluded, expenses that would be incurred equally for comparable campaigns.

Monitors, as experience in other countries shows, would have to be paid a stipend: in El Salvador a reasonable payment would be at least

¢25 a month for taking charge of the sets, handing out workbooks and acting as guidance counsellors. A rough estimate, obtained by dividing the target audience by a class of 20, reveals a need for 10,000 to 25,000 monitors, at a cost of between ¢2.5 million and ¢6.3 million. This is by far the largest expense, dwarfing television by comparison.

Another possibly large outlay involves the acquisition of 10,000 to 25,000 television receivers, an investment that, based on an average life of five years per set, would have to be amortized at a rate of ¢1.0 million to ¢2.5 million per year. Maintenance costs would arise, but they could be thought of as prolonging the life of the set.

But these are maximum figures for the reception stage. Sets in place or soon to be installed in rural junior high schools--perhaps 500 in number--could do double duty at night. Further, receivers required to make the continuing teacher education program operational would also be available at no additional cost. And finally, if television could be introduced into the primary schools, the investment in sets chargeable to rural education would be cut to the very bone. The ideal of course is a "triple play" to put ITV, transmitting and receiving equipment, to full use; with primary grades covered during the day time, teacher training on Saturday mornings, and rural education plus cultural programming at night and on week-ends.

The matter of comparative cost does not rest here since, to be conservative, a prorated amount of depreciation should be added. The expense is sizeable but not fatal to the case of ITV. Adding it all up, the minimum cost of a television campaign to reach 200,000 people is ₵2.7 million, stripped of receiver usage cost and Santa Tecla overhead; and ₵3.8 million when these are included. This means a cost difference in favor of television of at least ₵700,000 per year--enough to cover most of the operating budget of the ITV Department in 1971. On a more grandiose scale of audience coverage, these cost differences widen to a minimum of ₵3.1 million annually. These are payoffs well worth keeping in mind by educational planners.

Where effectiveness is concerned, there are several telling arguments in favor of ITV. In countries like Colombia, one is informed, people attend televised instruction whereas in traditional night school classes the attrition rate is high because people lose interest. That wastage, of course, would affect the cost per graduate. Under either system, to motivate completion, one could award certificates or give credits useful for more advanced work.

Second, in any three-stage teaching program much quality is inevitably lost as the message trickles down from well-informed professionals to less-educated community leaders and finally to farmers. By contrast, television delivers the information without intermediaries and straight on target.

Some other advantages adhere to ITV. The lead-time between planning the program and going on the air is much shorter than when two platoons of teachers must be trained in sequence before a program can reach the consumer. Quality control is more easily assured because one single message is broadcast to all. Only monitors are a variable factor. Revision of programs, based on feedback, is also simpler than in the traditional system--at least in theory. Arranging for an audit of activities, by adding this duty to the job content of supervisors, would be somewhat simpler under television.

The organization of such an enterprise is complex and not to be underestimated. The sheer number of people involved in either system is large. Obviously, one should begin small and run pilot programs in selected areas. Here too television has certain advantages. Once lessons are prepared, they can be used on an increasingly larger scale, without appreciable additional expense later on. Not so with teacher training where costs are repetitive and cumulative from pilot to full implementation.

Related to the rural education is another possibility, that of absorbing within it over-age students in what amounts to a catch-up program through the sixth-grade of primary school. It is contended that this shift would open up student-places for the burgeoning grade school population and hence save on hiring additional teachers and building more classrooms. In view of the relative lack of hard data and the speculative nature of these claims, the "Catch-Up Program for Young Adults" is treated in Appendix VI.

Add-Ons and Payoffs of ITV in El Salvador: A Summary

At this stage of the report it is time to come to grips with the big question of whether the ITV experiment in El Salvador has paid off or will soon do so, as an enterprise on its own. For the moment we shall ignore the wider systems effects such as benefits to the learner and his society.

The net results look respectable. Balancing the books on ITV's performance to date and on its potential in the near future, we arrive at a net three-year payoff figure of ₡18.8 million and this not under the most favorable assumptions (Table 4.5). This compares with an investment in television planning, facilities, equipment and technical assistance of ₡12.7 million between 1966 and estimated 1972 and 1973.

Counter to earliest expectations by Salvadoran planners, the Plan Basico program has been an additional expense. The idea of using monitors or paraprofessionals to tend the sets fell through.

On the other hand, the retraining of secondary school teachers was accomplished successfully within a year instead of the allotted two. Evidence supports the claim that these television teachers are doing better in the classroom than those using only teacher's guides and work books, the latter in large part a by-product of putting lessons on the screen. The cost advantage of this training project more than offsets the expense of enriching the Plan Basico grades with television.

A claim has been voiced at times that the television mode has permitted the hiring of primary school teachers for secondary grades where normally only university graduates, at higher salaries, would have been recruited. While we have not costed this "saving" in salaries as a separate element, its thrust may be folded into the training cost difference to make it more credible to the doubters.

TABLE 4.5

ADD-ONS AND PAYOFFS OF ITV IN EL SALVADOR: A SUMMARY 1/

Item	Amounts (In millions of colones)	Source
A. Add-On: Plan Basico Program (1969-72e)	-₡ 4.0	Table 4.1
B. Payoffs:		
(1) Training of Plan Basico Teachers (Realized)	+₡ 5.7	Table 4.2
(2) Primary Teacher Training (Normal Permanente) 2/ (3-Year Cycle)	+₡ 16.7	Table 4.3
(3) Rural Education and "Catch-Up" Program (3-Year Plan) 3/	+₡ 2.1	Table 4.4
C. Net Payoffs 4/		
3-year horizon, (2) + (3)	+₡18.8	

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e - Estimated

1/ - = Add-on; + = payoff.

2/ Differential between the three-month traditional and three-year ITV program, deducting from this estimated payoff a 500,000 allowance for monitors over 3 years.

3/ For 200,000 target audience. Lowest payoff estimate of ₡0.7 million for 3-year campaign.

4/ The different time frame of various programs makes aggregation of payoffs difficult. Three years was chosen as a convenient and plausible period.

Memo:	
Capital Investment in ITV, Santa Tecla Stage	₡8.1 million
Investment in Receivers	₡0.7 million
Start-up Costs	₡3.9 million
Total Investment Cost of ITV Project, 1966-estimated 1972 and 1973 (Table 2.5)	₡12.7 million

It seems futile to argue that in El Salvador, the quality of "normal school" training being what it has been, it makes no difference in teacher effectiveness whether courses last one year or two. One must compare what would normally have been done with the change that occurred when television reformed traditional techniques, and draw cost conclusions.

The offset between the add-on costs of the Plan Basico reform through ITV and the payoff involved in the teacher retraining program should not be looked upon as a merely mechanical subtraction, but as a systems effect. The two occurred simultaneously, within the same classroom. The extra expense incurred by enriching the student's learning environment helped to provide in-service training for the teacher and cut the period of his traditional formal education in half.

The two potential payoffs which ITV is likely to produce in primary teacher training and rural education look impressive. They have perhaps two aspects. Execution of these programs by traditional means is out of the question for reasons of time and money. And to reform the school without reforming the teacher first is impossible.

A second aspect lies in the realm of national income. Educational services will be performed under these ITV-assisted projects that otherwise would have been passed up because the country lacked financial means. In view of the large amount of idle human resources in El Salvador, including unemployed teachers, there is some cogency to claiming the creation of some new jobs and income.

One important potential saving--its time is not just yet--has been excluded because the requisite pedagogical and political decisions have not been made. That is, to leaven ordinary classroom pedagogy with some ITV without the ever-present teacher standing by. Programmed textbooks, independent work or group study all have their place alongside the "tube" in creating a highly cost-effective mixture. At the primary level, where the volume, the mass audience that the television medium craves, exists in such abundance, sizable cash savings are "up for grabs", as shown in the analytic tables comparing input costs per class-hour. Here savings are beyond dispute over definitions. But that step--in El Salvador?--lies in the future.

One is loath to abandon the topic of unused and underutilized technical capacity in education without some remarks on the fundamental malaise that grips this "service industry." At the core is a lack of basic theory of what causes teaching and learning to be effective. This knowledge is obtainable only through adequately funded research, carried out by qualified practitioners.

Our lack of knowledge about what constitutes an educational production "mini-function" at the student-instructor level has created a sense of near-futility. Some cynics, when asked about a choice of media, advise using the cheapest, on the supposition that no significant differences will result.

"Systems approaches" in education are too often limited to rearrangements of the physical environment and an economizing of inputs through "managerial" accounting for finance and student flows. These administrative exercises usually stop short of the key element, the learning transaction itself. The latter surely must be at the heart of anything worthy of being called instructional technology, from the lowliest primer to the latest lesson of computer-assisted instruction.

Until we know more about learning processes and media effectiveness, it will be difficult to convince people of the superiority of one technique over another. Instead of making changes rationally, educators will obey the tyranny of prevailing fads and the dictates of authority.

In ITV, the minimum that seems necessary in the present absence of better learning theory is some applied research in program production. Experiments are needed that seek to link defined objectives with carefully designed program inputs and validated teaching outcomes. The use of television as an economy move simply to transfer the conventional classroom scenario to the screen, embellished with plenty of "visuals," demeans the potentialities of the medium. In this field, one hopes, a useful beginning may be made in El Salvador.

Benefits of the Educational "Production Function"

It stands to reason that Reform/ITV, regardless of any *cost* superiority over conventional methods, should show tangible advantages on the *output* side. Such additional benefits may be looked for under at least five headings:

(1) Better learning performance.

(2) A faster and steadier flow of students through the "pipeline."

(3) A potential reduction in the average unit cost per classroom-hour.

(4) Higher income and productivity of graduates.

(5) Lower social overhead costs and a better "quality of life" for the better educated and their families.

Among the possible benefits of educational outlays one may distinguish a certain hierarchy of outcomes. Improved learning is the immediately desired goal and often looked upon as a good in itself. A materialistic world would by choice, and a developing country by necessity, look farther down the road. Ultimately the objective becomes a rise in productivity, measurable in large part by higher incomes of the working force. More learning in this productive chain becomes an intermediate factor for economic growth.

In controlling a multistage process it is standard operating procedure to check several key points along the line. In education the additional learning, as measured by performance tests, may serve as something like a surrogate for a student's potential to reach higher earnings. We do not wish to denigrate the "civilizing" function of a general education. It is just that the vocational payoff looms so large in countries that cannot afford to "consume" much schooling in the sense of heightening the ability to appreciate the finer things of life.

Contributions to Learning Performance

The use of test scores as proxies for benefits has been attacked, among other reasons, for the dubious ways in which results have been expressed. One finds statements in the literature that an average one-point gain on a comprehensive achievement test corresponds to x dollars of program expenditures and, additionally, that this one extra point (scaled on a continuum) means y dollars of extra lifetime earnings. Models which translate test scores into increased income prospects--tenuous at best even for Poverty Program retraining of the disadvantaged in the United States--appear to be wholly academic for El Salvador. The unit cost of some points on a student's test score seems a meaningless, if not ludicrous magnitude that captures nothing of value.

On the positive side, the evaluation team from Stanford University found sizeable learning differences in 1969 between junior high school students being taught by the traditional system and those in classes enjoying the fruits of reform and ITV. Such learning differences applied not only to the new curriculum but to materials common to both the new and the old.

Unfortunately at one point, crucial for this study in quantifying benefits, the findings of the evaluators were inconclusive. We refer to the question of whether television by itself--all other things as equal as possible--can improve learning. The administration of specially devised achievement tests was unable to catch statistically significant differences. Furthermore, the differences in scores most favorable to television programming turned up in the social sciences, the field showing the least gains in the reform-traditional class comparisons conducted in 1969.

These findings are disappointing because the use of television in El

Salvador does not limit itself to putting the teacher on the tube, "master-teacher" though he may be. The programs include a rich store of stills, film clips, cartoons, mock-ups and skits besides the teleteacher himself. Obviously it is far too much to expect a mere hardware configuration that intermediates between student and teacher to improve learning. The "hard" technology must be matched with an equally sophisticated "soft" technology so that the two in concert can produce the hoped for results.

Just spilling a cornucopia of "visuals" on the screen, no matter how entertaining to the program's producer, may leave the audience cold, as the people doing Sesame Street found out in the test studio. Currently plans are afoot to raise program quality by pre-testing programs before live audiences, and by using professional, goal-specific production techniques. Such feedback looping is likely to bring further progress and will hopefully manage to erase, at least in the environment of an "underdeveloped" country, the no-significant-difference stigma that hangs over past research to validate the television medium.

A wide spectrum of other beneficial changes has been brought about by Reform/ITV which promote learning by removing obstacles and adding incentives to the process. In practice it would be extremely difficult to set up laboratory conditions under which to isolate the learning effectiveness of the factors listed below. Part of their impact may already have been captured in the test scores logged in by the Stanford group.

Among the special contributions introduced by Reform/ITV should be enumerated the following items:

- Higher quality of teaching was reflected in more class participation, problem-solving, the use of visual aids, more discussion and less dictation and rote memorization.

- Observed improvements in learning occurred in patterns that suggested an equalization of initial disparities in "general ability" and reading skills. These disparities ran to the disadvantage of girls as against boys; of rural as against city children, and of offspring of parents in lower as against those of higher socioeconomic status.

- Post-reform data showed that educational aspirations of junior high school students considerably exceeded the scholastic attainment of the father. Although pre-reform attitude surveys are unavailable to serve as a benchmark, it is likely that incentives to further education were strengthened.

- Motivation to greater learning efforts was probably reinforced by television. Questionnaires indicated a distinct preference for TV-assisted classes as representing a superior learning environment, and this long after the halo-effect of the novelty had worn off. However, complaints about an inability to express opinions and to ask questions instantaneously pointed to some room for improvement in the use of the new medium.

- As a sign that reformed classes are more efficient, many teachers believe more material can be covered with the aid of television. The potential to accelerate course work, assuming that the previous pace was too slow, points to the possibility of saving money. Already various voices are heard debating the feasibility of reducing the nine years of basic education to eight, and this only one year after the recodification of the Education Law.

Elimination of Repeaters

The second type of benefit--an acceleration of through-put, with teaching quality constant or under control--has been discussed under the heading of repetition. A closely related facet is a possible reduction in the cost per graduate, thought to reflect a rise in the efficiency of the system. On closer examination, however, this turns out to be a benefit carrying a high budgetary price tag.

Two countervailing forces are at work here. Since a graduate's unit cost is proportional to the years he spends in school, speeding his progress by minimal repetition lowers this expense. But of greater weight in the cost coefficient, in El Salvador, is the army of deserters who chew up program money without ever showing their face on graduation day.

An elitist system of education would minimize the cost of the "final product" by weeding out potential wasters from the start. The only other means of showing low unit costs is to make sure that all entrants graduate in the shortest possible time. Those now falling by the wayside would be kept in the ranks to appear not only in the numerator of our key fraction--costs--but more importantly in its denominator--successful graduates.

The saving inherent in eliminating repeaters, as analyzed in Part II, was only 20 percent while the added bill attached to full retention came to as much as 52 percent over the primary education budget. Reducing the cost per graduate the equitable way--through retention--is a severe budget burden and, in the nature of the case, can never be painless a free good or a benefit by grace of instructional technology or Reform/ITV.

The data of Table 3.1 can be used to demonstrate, by comparing graduates with the number of student years spent by a recent cohort, that the Min/Ed has been spending 15 years' tuition money to obtain one sixth-grade graduate compared to an ideal norm of only six years--a sobering fact that gives one pause. By contrast, the staying power of those making it to junior high school is extremely high.

Perhaps the picture is less bleak than just painted. A school is not a china factory where only perfect pieces count as saleable products. Drop-outs in the upper grades are not a complete waste, and even the lower graders may achieve a measure of functional literacy, yet their economic value is definitely impaired if a diploma makes a difference in employability and success in the job market.

A Solo Part for ITV

A third kind of benefit of Reform/ITV is still only a gleam on the horizon. The comparative unit cost per class-hour of ITV is lower than that of using a teacher in the conventional way once the audience reaches a break-even size. This means that ITV can save money directly if properly integrated and intermixed with other, costlier modes, and that it can save money indirectly, by playing the part of a catalyst in the reform package, to open the door to the acceptance of media inputs that in their appropriate place may be more cost-effective still, like programmed texts. In a growing school system, any money saved is money earned as seen from a cost-beneficial standpoint.

The subject has been fully discussed in an earlier section of this report and needs no further amplification here.

Added Earning Capacity

The fourth type of benefit, and one whose measurement has generated a considerable literature, concerns the additional earning capacity of students undergoing some incremental process of education or training, such as high school, college or some professional specialty like Law or Medicine. This line of thought should be taken seriously, no matter what the difficulties, theoretical and practical, of measuring and projecting income differentials.

Economic returns to education as a quantitative measure of benefits, however, requires certain minimum conditions for successful application.

One such condition is the existence of age-education-income profiles such as are available in the United States and which, under carefully stated and restrictive assumption, may be interpreted as prediction devices. A second technique of estimating added income from schooling is to pick some broad-based occupational categories, the entrance requirements of which demand a specific type of certificate or diploma. The lifetime income differential between, say, unskilled work and certificate-tied occupations could be considered as an estimator of the monetary return on educational investment.

In El Salvador neither approach seemed feasible. The first was stopped cold by the absence of data while the second foundered for more complex reasons. Graduation from the sixth or ninth grade was a requirement only for higher education rather than for any widely-held kind of job. Nor was the system, pre- or post-reform, designed with specific career objectives or manpower goals in mind. Unemployment was rampant. To assign life-time income differences between skilled and unskilled occupations to persons holding primary or junior high school certificates seemed too desperate a measure to defend, let alone one that would justify the time-consuming calculations necessary.

Unlike the amount of planning that is going into the diversified high school programs, the addition of three years of junior high school has not been subjected to any searching questions about either broad or specific employment needs. It is very well to say that El Salvador's only natural resource, like Japan's, is its people, and that trained manpower will be needed no matter what political regime may dominate the future. But since the enrollment targets are the most expensive items on the list of reform, people are asking what specific benefits Salvadoran children will reap when they leave the ninth grade instead of the sixth.

In this sort of controversy, whoever is saddled with the burden of proof is at a disadvantage. An educator would be hard put to show what good the three extra years will do in the world of work. Even if El Salvador caught the "diploma disease"--that no one without a nine-year certificate could pump gasoline--the new wave of graduates might simply displace unskilled labor. Net employment effects would be zero.

Putting the shoe on the other foot, the critics of nine years of educacion basica would have to argue that six years of school is enough for the average, mainly rural Salvadoran child of 12 or 13 years. That is hard to make stick.

In the cities, schooling has an auxiliary custodial function: to keep youngsters in their formative years off the streets. A lack of employment makes the "opportunity cost" of such schooling close to zero. Not so in the country. We are told that a frequent cause of absenteeism is the obligation of children to help in the fields where plots are staked out for them to attend. If true on a wider scale, the benefits of three extra years beyond grade school would come under fire from the farm population as offset by the real cost of lower harvests. Some special relevancy of the curriculum to rural problems is needed to balance the farmer's cost-benefit equation in schooling.

The significant point is just exactly what the new curriculum comprises and how well educational objectives are defined and pursued. While this is territory outside the scope of this study, the preoccupation of parents in El Salvador is the same as that in the United States: education for what? While narrow vocational training belongs in the actual place of work, a broad foundation in technology is required, regardless of academic or business careers. Each year of schooling must pull its weight, a touchy subject that remains unresolved. Conventional manpower studies, as specifics for job-oriented education, have a dismal history. Some more imaginative approaches may help guide the curriculum of the future.

Qualitative Benefits

The last set of potential benefits to be noted involves social progress, like better citizenship in peace or war, a cultural awakening and more enlightened attitudes toward, say, the country's population problem. Among the less tangible or qualitative benefits which loom large for the individual are the social prestige that goes with an education or degrees; increased self-confidence; and a deeper enjoyment of life. As school attendance rises, there is a further multiplier effect in that better educated children pass on to their parents, and eventually to their own progeny, the benefits of better information and a more adequate social value system. Some would count a rise in discontent as a positive value if channelled into social change short of violence. Reductions in sickness and crime would lighten the burden of public expenditures. It is much too early to try quantifying this kind of result in relation to

Reform/ITV, but it is none too soon to build social welfare objectives clearly and decisively into future programs.

Summary

Benefits in tangible, quantifiable form were more difficult to identify than costs. A number of substantial payoffs emerged due to Reform/ITV, one of which--the difference between the traditional and the modern way of training junior high school teachers--exceeded the add-on operating and recurrent capital cost to date of television in the Plan Basico grades.

Training costs were cut in half because formal work at the teachers' college could be shortened while teaching in a television enriched classroom by itself functioned as a continuing training device. Two new uses of ITV, the retraining of primary school teachers and broadcasting of rural education promised additional payoffs in coming years, more than sufficient to match the total investment in television hardware.

Two other kinds of benefits were investigated but found wanting. While it was hoped that television in the classroom meant improved learning, other things equal, achievement tests applied to ITV and control classes failed to show statistically significant differences. Taking reform and television in conjunction, however, the same type of evaluation model revealed a distinct superiority of the new over the old system. In numerous other ways Reform/ITV seemed to pave the way for a better learning experience by up-grading and enriching the classroom environment.

The lack of plausible employment objectives tied to the new curricula of the two-cycle and three-cycle courses of study, and the absence of any clear direction toward vocational and manpower goals, put the study at a disadvantage. They deprived it of the use of a standard evaluation yardstick of possible benefits, the incremental lifetime earnings attributable to longer schooling. But even had this not been the case, the serious unemployment situation and the lack of job openings in El Salvador, even for university graduates, raised disquieting doubts whether the new knowledge associated with better-educated youngsters would be readily capitalized in the labor market. If these doubts are justified, earnings benefits are elusive. A brief review of possible qualitative benefits rounded out the benefit section of the study.

APPENDIX I

Recommendations to Lic. Walter Beneke

Minister of Education, El Salvador

1. Boost Enrollment in Junior High School

As a first and realizable step toward the goal of making nine years of schooling universal, graduates of the sixth grade should be considered priority candidates for junior high school. They have already proven their staying power, and many will feed into the new diversified high school program. Despite a large jump in enrollment in 1971, still only about 50 percent continue on to the third cycle of public school. The cost of full retention--an objective not likely to be reached in 1972 or even 1973--may be estimated at ₡10.0 million, assuming the use of double shifts.

2. Reduce the Educational Deficit in Primary School

The second priority toward providing a ninth-grade education is to reduce drop-outs and increase retention in the primary schools, in order to produce more graduates. This would eventually cost something like ₡12 million but, since it would take many years to achieve, the additional budget expense will climb gradually. Adoption of the 3-3-6 system could reduce the cost to perhaps ₡9 million.

3. Minimize Repetition in Primary School

Appreciable savings--the most conservative estimate is about ₡2 million annually--could be realized by improving teaching and evaluation processes in primary school so as to reduce repeated grades to a minimum. This should be one of the principal objectives of the primary teacher retraining project. This recommendation is best considered along with the one following.

4. Change-over from the Traditional to 3-3-6 Pattern

The 3-3-6 pattern in primary school, and double shifts in the "third-cycle" grades, should be implemented as rapidly as possible. The savings in payroll, school by converted school, could easily be one-third of the traditional system, and probably more. Since existing faculty would be used more fully, hiring and salary expenses would stabilize. Between 1960 and 1971, the Min/Ed has utilized its "growth dividend"--an annual increase in the operating budget of between ₡2-4 million--mainly to add an average of 600 teachers a year. Under the effects of Recommendations (3) and (4) this money would be saved and become available for other programs, such as school construction, ITV and even higher salaries for the existing faculty.

5. "Triple-Play" Use of ITV

For economy's sake, television should be used on a wider scale and in at least three ways:

- Instructional television in educacion basica during the daytime hours.
- Rural instruction and "extension" television in the evening.
- Primary teacher training on Saturday mornings.

Sundays and holidays could be used for cultural programs of a lighter vein. It is assumed, as corroborated by the Stanford evaluations, that ITV at a minimum can do and does as good a teaching job as the traditional media.

When a decision is made to extend ITV to the six grades of primary school, the extra cost, including the preparation of teacher's guides and workbooks, will be about ₡1.5 million. As for 1972, rural education and teacher retraining should occasion little if any rise in the ITV budget because the system has enough slack capacity to absorb the load: existing third-cycle programs need only revision and retaping rather than original production.

6. More Efficient Use of ITV

While the teacher should be the "manager" of classroom activities, he need not always be standing by every time the set is turned on. To avoid using ITV as a pure "add-on" cost, telelessons should be employed in conjunction with workbooks, programmed texts and student monitors, thus saving the intervention of the teacher for discussion and guidance for afterwards. In changing the mix of instructional media, a key element from a cost standpoint is to permit less labor-intensive learning situations to arise, such as the interaction of the audience with a televised lesson just mentioned.

A beginning toward this pattern is possible in El Salvador because:

- the normal permanente will instruct teachers themselves via ITV without the presence of a teacher.
- the rural education program will use only monitors.
- the teacher in the "3-3-6" school, with 20 percent more teaching hours and with two grades instead of one, will be receptive to some ITV use without having to be physically present himself.

Note that once the tele-audience rises above 430 classes per year in the third cycle and above 720 classes per year in the primary grades, one hour of ITV--including teacher's guides and workbooks--is cheaper than one hour of classroom teaching. If 1,500 grade school classes were to view a given program annually, the hourly unit cost of ITV would be one-half that of a live teacher.

7. Phased Acquisition of Television Sets

Receiving sets, a component of all programs, should be acquired in stages. The first stage is to put sets into third-cycle schools where they can serve evenings for rural education and Saturdays for teacher retraining. The second stage will mean the purchase of receivers for localities lacking even borrowed or rented sets. The third stage calls for the placement of sets in primary schools. Whether to finance receivers by local communities, the central government, special taxes or any combination of measures is a political question. A receiver, with a maximum price of ₡500 and a five-year life, costs ₡100 annually or ₡10 a month; and for 100 viewers per set, 10 centavos monthly.

One other recommendation, namely, that the Ministry of Education should reorganize, expand, and formalize its planning function, can be omitted since it has already been accepted and implemented by Ministry officials, with the guidance of Dr. Russell G. Davis of Harvard University.

APPENDIX II

Methodology of Analytic Budget Projections

Projections of Primary School Enrollment

Since the chief clientele of any country's school system is its school-age youngsters, attendance any time in the future bears a direct relationship to that population. For El Salvador, the best available and generally-used series on population growth is that originally produced by CELADE, a UNESCO agency, and published by various sources. This series consequently formed the projection base of enrollment for this study.

A precise technique of forecasting the future student body in El Salvador's "first and second cycles" would require, for a start, estimates of entrants into the system and a follow-up of each year's cohort as it advanced grade by grade. It would call for determining past rates of dropouts, failures and repeaters, as well as forecasting future changes therein. Urban, rural, and other geographic differences--known to be sizeable for these coefficients--would have to be carefully taken into account.

For reasons of time and economy and also because of questions about the reliability of existing data, a dovetailed "diagonal" modelling of projected enrollments over time had to be left to the future labors of educational planners in the Ministry of Education. Fortunately, historical data on attendance, like those on expenditures, revealed a thrust of their own that showed promise as a forecasting device if subjected to independent checks. A free-hand trendline through the public school enrollment figures for 1961 through 1971 yielded a forecast of 690,000 students for 1975 and 900,000 students for 1980 registered in the six primary grades, where the vast bulk of the country's student body is concentrated.

To aid in the interpretation of these figures, applying to February, late enrollment tends to raise them by May, when a second count of pupils is taken. Thereafter desertion by students predominates and considerably reduces attendance by the end of the term.

The actual data suggested some slowing down in the rate of growth between 1968 and 1971, but this did not necessarily call for fitting a parabola. The apparent acceleration of enrollment between 1963 and 1967 could be traced to the stimulus of the school building program financed by AID Loan 003, and a similar "catching up" could be expected in the future if other infusions of foreign funds were to give construction another needed boost.

A more thoughtful, standard method of projecting primary school-going, as suggested above, is to observe historical relationships between general and student populations and to extrapolate past proportions. This approach, as it happened, came to yield both high and low estimates for the target years 1975 and 1980 which straddled the values produced by mechanical projection (Table A-2.1).

It is interesting to note, too, that the behavior of school-going rates paralleled that of the raw enrollment data: a pronounced uplift between 1963 and 1967, and since then, a levelling off. The explanation, as before, must lie in the on-again, off-again rythm of school construction.

TABLE A-2.1

ENROLLMENT IN PRIMARY GRADES OF EL SALVADOR

ACTUAL 1961-71 AND BASELINE ESTIMATES FOR 1975 and 1980

Year	(1) Population Age 7-15	Enrollment (2) Student-Body: Grades 1-6 [a]	(3) Ratio (2):(1) (Percent)
	(In thousands)		
1961	584	341	58.4
1962	607	359	59.1
1963	630	358	56.8
1964	652	379	58.1
1965	674	398	59.1
1966	695	434	62.4
1967	718	475	66.2
1968	743	480	64.6
1969	769	517p	67.2
1970	798	531p	66.5
1971	829	563p	67.8
1975			
Low estimate	977	680	70.0
High estimate	977	720	74.0
1980			
Low estimate	1,174	860	73.0
High estimate	1,174	940	80.0

e - Estimates
p - Preliminary
[a] February or May enrollment, whichever is higher. Public and private section, urban and rural zones, male and female, day and night students.

Sources: Col. (1) Conaplan, *Indicadores Economicos y Sociales*, (Sep.-Dec. 1970), p. 14.

Col. (2) Ministry of Economy *Anuario Estadistico*, Vol. V (1965 to 1969); Ministry of Education, Department of Statistical Services (unpublished data for 1970 and 1971).

The higher set of enrollment estimates for 1975 and 1980--74 percent and 80 percent respectively--were found to be located on a freehand trend drawn through the entire series of ratios between primary students and the group 7-15 years of age, the statutory years of school attendance under the new 1971 Education Law of El Salvador. The lower estimates of 70 percent and 73 percent were based solely on the rather stagnant recent ratios of 1967 and 1971, on an assumption that attendance, once a proportion of roughly two-thirds of eligible youngsters in school had been arrived at, might meet barriers increasingly difficult to pierce for socio-economic reasons.

Logically, the last-to-enroll are likely to be those who face the greatest obstacles to school attendance and have the most cogent reasons for not attending. A formidable list of such reasons was drawn up for purposes of a student questionnaire filled out by the teachers; but the data collected are not considered reliable.

Other analytic estimates of a wider population belt, say, ages 6-19 years, are justified because many actual and potential "grammar school" students have passed their fifteenth birthdays. The demographic series representing this group, however, moved at about the same pace through time as did that of the group aged 7-15 years, so that either one gave almost identical results for the purpose at hand--baseline estimates of school registration in the absence of Reform/ITV.

The year 1971 witnessed the occurrence of a population census which will provide new benchmarks to put the CELADE statistics to the test. Some revisions of our enrollment projections, although perhaps not too drastic in nature, will undoubtedly be in order. Enumerating practices, in contrast with central processing methods, have probably not changed too radically in El Salvador since the last census took place in 1960, and any consistency of bias would favor the present projections.

Educational demand can also be measured by considering that births in any one year are the basis of the student body of some years later on. By netting birth and mortality rates at early ages, the investigator may derive estimates of school-going that incorporate comfortable lead-times for classroom construction in a well-planned system. What mitigates against this normative approach in El Salvador is the chronically wide age-dispersion among grade-school students, rooted deeply in the sociology of the country, particularly conditions in rural areas. For some time to come the enrollment characteristics of young Salvadorans cannot be expected to conform to chronological age-norms.

Projections of High School Enrollment

The flow of primary-school graduates into public high school, at its most simple, may be taken as a function of the number of students who manage to pass the sixth grade. Actually, such graduations from public school, in comparison with total grade school enrollment including a 4 percent private school component, climbed between 1965 and 1969 from about 5 percent toward a rate of 7 percent (Table A-2.2). Again, practicing conservatism with regard to budget implications, we assumed that the 1968-70 average rate of 6.6 percent would remain constant unless driven by the

TABLE A-2.2

GRADUATES OF THE 6th GRADE OF PUBLIC PRIMARY SCHOOL

ACTUAL 1965-69 AND BASELINE ESTIMATES FOR 1975 AND 1980

Year	(1) Students Passing 6th Grade	(2) Total Enrollment, Grades 1-6	(3) Ratio: (1):(2)
	(In thousands)		(Percent)
1965	21.0	398	5.3
1966	27.5	434	6.3
1967	28.3	475	6.0
1968	31.6	480	6.6
1969	34.0	517p	6.6
1970[1/]	34.5	531p	6.5
1975			
Low estimate	45.0	680	6.6
High estimate	47.5	720	6.6
1980			
Low estimate	56.5	860	6.6
High estimate	62.0	940	6.6

p - Preliminary

[1/] Ministry of Education, Department of Statistical Services.

Sources: Col. (1) Ministry of Economy, Anuario Estadistico, Vol. V.

Col. (2) From Table A-2.1.

spur of reform. Applying this rate to our earlier enrollment projections for the primary grades gave us estimates of sixth-grade graduates in 1975 and 1980 to serve as a base, in turn, for calculating the demand for places in the public high schools.

Because of a lack of sufficient or fully reliable data, high school enrollment--dispersed over numerous career tracks, some requiring the old Plan Basico grades--is difficult to measure and even more so to estimate for the future. The best estimate, one setting the total student body of public high schools equal to the number of graduates from the sixth grade, is probably close to the mark if the years 1967 and 1969 are any indication (Table A-2.3). In 1969, in pronounced fashion and to a somewhat lesser extent in 1970, the figures seem to show that Reform and ITV, in the three years of Plan Basico, had already begun swelling public high school enrollment. The latter year was ahead of 1968 by a sharp 40 percent, whereas private institutions showed a slight drop in their enrollment. The year 1971, under the spell of Reform, is excluded from these baseline considerations. Some of the smaller and financially weaker private high schools were reported to have been closing their doors as enrollment in public institutions became free, although the larger, more prestigious schools run by various religious orders were believed to be holding their own.

Before accepting the premise of equality between sixth-grade graduates and total public-high-school enrollment, using the former as an estimator of the latter, we tested a number of alternative series and the relationships between them. Samples used figures for both the public and private

TABLE A-2.3

HIGH SCHOOL ENROLLMENT IN EL SALVADOR

ACTUAL 1965-70 AND BASELINE ESTIMATES FOR 1975 AND 1980

Year	High School Enrollment: Total (1)	Private (2)	Public (3)	Students Passing 6th Grade (4) (In thousands)	Ratio (3):(4) (5) (Percent)
	(In thousands)				
1965	51.5	n.a.	n.a.	21.0	n.a.
1966	55.8	n.a.	n.a.	27.5	n.a.
1967	68.4	39.9	28.5	28.3	99
1968	76.9	50.2	26.7	31.6	118
1969	84.6	50.7	33.9	34.0	100
1970	86.9	49.2	37.7	34.5	109
1975					
Low estimate	-	-	45.0	45.0	100
High estimate	-	-	47.5	47.5	100
1980					
Low estimate	-	-	56.5	56.5	100
High estimate	-	-	62.0	62.0	100

Sources: Col. (1) to (3) - Actuals from Ministry of Economy, Anuario Estadístico, Vol. V.
In (3), the specialties of agriculture and nursing, being outside the Min/Ed budget, are excluded.

(4) - From Table A-2.2 (Public Sector only).

sectors combined, and trials were made to see if lagging high-school attendance one year behind graduation from grammar school, or from the three previous graduating classes, would materially change the picture. But all these computations and the drift of some earlier, less reliable data not cited here, carried the same message: the linkage between high school attendance and primary school graduation has been basically stable over the better part of a decade.

The above-noted increase in the Plan Basico grades was apparently compensated for by the closing out of vocational high school courses in the public sector, thereby stabilizing high school enrollment as a whole.

While the preceding considerations permitted estimating high school demand, the paucity of reliable information and the relatively small size of the high school program and related expenditures, in the absence of Reform, made it pointless to splice in once more two coefficients, a high and a low "continuation ratio," in order to calculate a range of estimates. Accordingly, we contented ourselves with the stipulated assumption of equality.

Application of Unit Costs

The translation of both grade and high school enrollment data into their budgetary equivalents was accomplished mainly with the aid of specially computed unit cost data. Primary grade enrollment estimates were first adjusted downward by 4 percent to eliminate private schools (Table A-2.4). For public primary education, operating costs per student between 1967 and 1970 were found to vary between a low of ₡68 and a high of ₡94. These figures were derived by taking direct program costs,

TABLE A-2.4

ADJUSTMENT OF PROJECTIONS FOR PRIVATE SCHOOL ENROLLMENT
1975 and 1980
(In thousands)

Year	School Enrollments:		
	Total	Private 1/	Public
1975			
Low Estimate	680	27	653
High Estimate	720	29	691
1980			
Low Estimate	860	34	826
High Estimate	940	38	901

1/ Estimated at 4 percent of total enrollment based on data 1965-71.

Source: Table A-2.1

as recorded in the budget documents, and by splitting general administrative overhead in the proportion of such direct expenditures between primary and high schools. To be sure, ancillary and cultural activities of the Ministry were responsible for some administrative burden, but a finer allocation of overhead would have been cumbersome at a negligible gain in precision.

An analogous procedure for the same period was employed to obtain unit costs at the high-school level, resulting in a low and high unit cost of ₡158 and ₡187 for 1967 and 1968 respectively. We adopted the 1968 high figure as our most realistic baseline index. High school enrollment data in earlier years were deficient and, on the expenditure side, budgeting by teaching hours made for messy calculations. Also, as in the enrollment statistics, high school budget data for 1969 and 1970 already reflected an overlay of reform elements as shown by a fairly steep climb in operating costs per student above baseline.

One technical matter merits mention. Because the primary grades predominate in the budget allocations, estimated outlays are highly sensitive to small changes in unit cost. By contrast, similar variations in costs applied to the currently still small public high school enrollment make far less of a difference in the forecasts.

To repeat, the multiplication of these unit costs by the applicable primary and secondary enrollment projections provided the starting point for the first set of analytic baseline estimates for the Ministry of Education operating budget for 1975 and 1980 (Table A-2.5). As a rule, wherever we had

TABLE A-2.5

BASELINE ESTIMATES OF THE MIN/ED BUDGET

BASED ON ENROLLMENT AND UNIT COSTS, 1975 AND 1980

Item	Estimates for 1975	
	Low	High
A. Primary School Program		
(1) Enrollment, Grades 1-6	650,000	690,000
(2) Unit Cost per Student	¢ 86	¢ 94
(3) Operating Expenditures	¢ 56 MM	¢ 65 MM
B. High School Program		
(4) High School Enrollment	45,000	47,500
(5) Unit Cost per Student	¢ 187	¢ 187
(6) Operating Expenditures	¢ 8.4	¢ 8.9
C. Combined Estimates		
(7) Operating School Programs	¢ 64.4MM	¢ 73.9MM
(8) Surcharge, Cultural Activities	2.6MM	3.0MM
(9) Operating Budget, Min/Ed	¢ 67.0MM	¢ 76.9MM
(10) Surcharge Coefficient, Transfers and Capital Outlays	118%	136%
(11) Total Budget, Min/Ed	¢ 79.0MM	¢105.0MM
D. Unit Cost Adjustment		
(12) 4 Percent Annual Rise in Primary School Unit Cost: 5 years	+¢ 11.0MM	+¢ 18.0MM
(13) Adjusted Operating Budget, Min/Ed	78.0MM	¢ 89.9MM
(14) Adjusted Total Budget, Min/Ed	¢ 90.0MM	¢118.0MM

Footnotes: (1)From Table A-2.4, public schools; figures rounded.
(2)and (5) From analysis of budget documents (see text).
(3)Product of (1) and (2).
(4)Equal to 100 percent of graduates of 6th grade, as per Table.
(6)Product of (4) and (5)
(7)Sum of (3) and (6).
(8)Coefficient of 4 percent applied to (7).
(9)Sum of (7) and (8).
(10)Ratios of Total Budget to Operating Budget; the low coefficient applies to 1964 and the high to 1965.
(11)Product of (9) and (10).

(Continued on next page).

TABLE A-2.5 (Cont.)

BASELINE ESTIMATES OF THE MINISTRY OF EDUCATION BUDGET BASED ON ENROLLMENT AND UNIT COSTS, 1975 AND 1980

Item	Estimates for 1980	
	Low	High
A. Primary School Program		
(1) Enrollment, Grades 1-6	830,000	900,000
(2) Unit Cost per Student	₵ 86	₵ 94
(3) Operating Expenditures	₵ 71.0M	₵ 85.0M
B. High School Program		
(4) High School Enrollment	56,500	62,000
(5) Unit Cost per Student	₵ 187	₵ 187
(6) Operating Expenditures	₵ 10.5M	₵ 11.6M
C. Combined Estimates		
(7) Operating School Programs	₵ 81.5M	₵ 96.6M
(8) Surcharge, Cultural Activities	₵ 3.2M	₵ 3.8M
(9) Operating Budget, Min/Ed	₵ 84.7M	₵ 100.4M
(10) Surcharge Coefficient, Transfers and Capital Outlays	188%	136%
(11) Total Budget, Min/Ed	₵ 100.0M	₵ 142.0M
D. Unit Cost Adjustment		
(12) 4 Percent Annual Rise to Primary School Unit Cost: 10 years	+₵ 28.0M	+₵ 34.0M
(13) Adjusted Operating Budget, Min/Ed	₵ 112.7M	₵ 134.4M
(14) Adjusted Total Budget, Min/Ed	₵ 128.0M	₵ 176.0M

Footnotes (Cont.)

(12) Primary school unit costs rose from ₵66 in 1960 to ₵94 in 1970, or by 40 percent in 10 years. The figures in the table are the differences between operating expenditures shown in (3) and as adjusted upward to allow for further projected 4 percent annual rises above the levels indicated in (2). The multipliers used to increase (3) were 1.20 in 1975 and 1.40 in 1980.

(13) Sum of (9) and (12).

(14) Sum of (11) and (12).

ranges of estimators, we combined the lows into one group and the highs into another.

The low estimate, not surprisingly in view of our conservative biases, fell considerably below the trendline projection; the higher estimate less so. Some further adjustment seemed necessary, as explained below.

Superimposing the Ministry's transfer and capital expenditures by means of coefficients representing historical relationships of these components within the total budget produced echoes of the findings for the operating budget. The low estimates fell considerably short, while the high estimates continued to deviate on the low side from the baseline graph.

Adjustment for Rising Unit Costs

The failure of the analytic estimates to come up to the free-hand trend values, while tolerable for 1975, seemed appalling for a year as far out in time as 1980. Somewhere along the line the estimating model was out of line with the baseline estimates if not with the real world. Since the element of enrollment projections gave such a good fit between the mechanical and analytic techniques, the problem had to be--and was--the supposition and use of static unit costs. Investigation revealed that the fact that teachers missed pay raises for something like a decade had not insured steady unit costs in the past. A rough but reasonably reliable reckoning of annual operating expenses per primary student in 1960 produced a figure of ¢66, which implied that in ten years time the climb to ¢94 was one of over 40 percent.

Since across-the-board salary increases were not the cause, the reasons for this rise had to be sought in changes in the mix of teaching staff with regard to seniority and professional classifications, and in changes in administrative overhead. Whether a lowering of student-teacher ratios in recent years was a source of higher unit costs is extremely debatable for anyone familiar with the crowding and shortage of classrooms, except in some upper grades.

Applying an average 4 percent annual rise to operating expenditures to allow for the expected upward drift of unit costs, we obtained estimates for both the current and total Ministry of Education budgets for 1975 and 1980 that were in good agreement with trendline values. Only for the operating budget for 1975 did the analytic estimates overshoot the linear projection. In justification it can be, and here is, contended that continued upgrading of the teaching profession, unionism, the liberalization of fringe benefits and--this is more arguable--a further fattening of the bureaucratic layers in the Ministry make such an annual upward adjustment in unit costs, without benefit of Reform/ITV, a plausible forecasting proposition.

A Digression on Alternative Analytic Baseline Projections

A third and also analytic baseline projection might be constructed that would not use unit costs as such but begin by translating the future enrollment data into an expected demand for teachers, in recognition of the primacy of payroll in the budget. This approach would bring student-teacher ratios explicitly into play as a key variable. It would carry with it the further advantage of letting estimated Ministry expenditures reflect a whole scale of possible teacher salaries.

Administrative expenses could then be grafted on as a constant or variable ratio, depending on either the evidence of a past trend, if any, or on assumptions about what the future might hold. Next, transfer and capital expenditures could be added as before, to forecast the total Ministry of Education budget.

The format of earlier budgets which, as noted above, carried teaching hours by various teacher categories as a line item, make this model difficult to apply except for very recent periods. Further, an independent estimate of future student-teacher ratios, extremely variable by grade and by local area, represents a "sticky wicket." Perhaps one of these days the new planning office in the Ministry of Education may want to carry out some experiments with this forecasting technique to test its consistency with the other two methods discussed previously.

APPENDIX III

ON THE COSTING OF INTEREST CHARGES AND IMPUTATIONS

The treatment of interest charges requires some special comment since we did not include these in the cost model for present purposes. The reasons were as follows:

- Interest charges for Reform/ITV loans were still virtually non-existent because AID financing defers such payments, while little of the World Bank borrowings had yet been disbursed.
- The interest rate on AID and international institution loans in many cases embodies a subsidy so that a commercial rate would have to be determined and substituted to get at real costs. The same is true of grants, whether monetary or in kind.
- The relevant interest cost would have to be based not simply on cash payments but on present values of these payments. The more distant they are, the lower their "present value cost."
- Questions are raised about what discount rate to apply to interest rate subsidies to reflect the true cost of capital to El Salvador. In that connection, public education systems, regrettably, tend to consider equity funds derived from taxpayers of the community as cost-free.
- For domestic budget comparisons, the inclusion of interest costs would distort the picture unless a net fixed asset value or, better, a lease value was imputed to existing school plant and equipment. This lease or rental value--the opportunity cost of school investment--would then have to be subjected to a further imputation of interest cost.

- Interest payments, being a charge against the Treasury rather than against individual ministries, do not appear in the Min/Ed's budget and hence are easily overlooked once debt has been incurred.
- Quite generally, the role of interest in capital budgeting is purely that of a discount factor. Only in conventional accounting systems does interest figure as one of the costs of investment.

On the other hand, depreciation of ITV plant and equipment was taken into capital costs, even though El Salvador does not use depreciation accounting in its school system, or for that matter in other public investments. However, the life of television hardware and hence its period of amortization are relatively short. Replacement outlays are in sight and will, before long, be translated into tangible budget charges, not mere book entries.

In brief, the inclusion of interest charges would not have made much practical difference for the usefulness of this study as a policy instrument while opening a Pandora's Box of theoretical arguments, imputations and adjustments. If the purpose had been to compare educational investment with other capital projects, and if it had been feasible to construct the conventional income-to-incremental-education tables, one would seriously want to reconsider the situation, and perhaps bring in the full technical apparatus of capital budgeting, complete with discounted cashflows, imputations and opportunity costs. Again, these techniques in the context of this particular report would be esoteric and of purely academic interest, without prejudice to their proper place in the standard model.

APPENDIX IV

MEASURING THE SIZE AND COST OF COVERING THE DEFICIT IN STUDENT PLACES

Difficulties of Counting the "Never-Enrolled" Students

The reason for restricting the estimates to the partial deficit of "once-enrolled" students becomes clear when one considers the obstacles encountered in trying to account for the deficit group omitted in this report, that is, the "school avoiders." As a first hurdle, in order to count the exact number of those by-passing school within a given age-cohort, one would have to deduct from it all children who enter the first grade, whether enrolling at the first opportunity or with tolerable lags after becoming eligible. To identify the laggard entrants properly, of course, age-specific first-grade enrollment data would be needed through the years, cleansed of the repeaters usually included therein.

The next hurdle in measuring the portion of the deficit due to school avoiders is deciding how many years of schooling, including repeated grades, the system should tolerate. If primary students, on the average, repeat one of their six years, seven years of school becomes the norm applicable to all, including the "never-enrolled" if one could induce them to attend. This allowance for repeated grades would probably be a minimum for the latter group, perhaps more than ordinarily failure-and-repeater prone.

By multiplying out, we would arrive at the total number of additional annual student places to be provided for those entirely missing from the registration rolls over a seven-year period. The budget outlay would be obtained from an application of the appropriate unit costs in primary schools.

Should the criterion at issue be a full nine years of mandatory basic education--not a target evaluated here--the average time spent in the third cycle of studies would have to be added, entering the calculations at the somewhat higher unit cost indicated earlier in this report.

The second group that makes up an age-cohort's educational deficit is easier to keep track of: its members have already registered in school at least once. After that point, it is only a matter of noting at what grade they leave the system and of counting up the missing years. While passing a grade is of course an important test of learning, from a strict cost standpoint it is quite irrelevant. The Min/Ed has done all in its power once it provides an enrollee with the needed facilities: a teacher, books and a desk. In other words, we assume that dropping out during the school year in El Salvador does not occasion any sizeable incremental costs. Deserters, it is true, are likely to become repeaters in subsequent years, but the correlation is unknown and, once again, omitting a further upward adjustment of repeater rates tended to keep the already high cost estimates down.

Again, the cost of deficit coverage for this second group--the registrants--corresponds precisely to the number of school-years that would be required to complete the first two cycles or all three cycles of basic education. As before, in the case of the school avoiders, we would have to follow the children's diagonal progression through the time x enrollment-by-grade matrix, with appropriate allowances for repetition and retardation.

The Student Model and Its Assumptions

Even the limited kind of cohort analysis, attempted here, requires enrollment statistics that show a student's age and status as either an entrant, reentrant or repeater in a given grade. Lacking such statistical breakdowns, a rougher model suffices to permit approximations. In costing the elimination of enrollment deficiencies, the controlling demographic variables consisted of dropouts and repeaters. While some figures for the latter were available, the former had to be estimated, grade by grade, to accumulate the number of school years missing for the target population in order to reach a predetermined standard of attendance.

These data requirements for a reasonable estimate of the target fit a concept of student flows that expects initial enrollment to sort itself out by the beginning of the next school year into three categories: graduates continuing to the next grade; repeaters; and dropouts, both intragrade and intergrade. Such a simplified scheme omits desertions due to death or emigration, and counts as deserters students who may later rejoin the system; but here these groups could be assumed to be relatively minor.

The first category, continuing graduates of a given grade, may be estimated from the following year's initial enrollment in the next higher grade, by simply deducting the repeating students included therein (Table A-4.1). If data for the second category--those students destined to repeat their current grade--are at hand, the third category--drop-outs--emerges as the residual or unknown in the following simplified equation of student flows:

$$E_0 = G_1 + R_1 + D$$

Here, for each grade under consideration, E_0 is the initial enrollment at t_0; G_1 represents continuing graduates; R_1 are the repeaters-in-grade the following year; and D are the students dropping out between the beginning of one school year and the start of the next.

APPENDIX TABLE A-4.1

DERIVATION OF NUMBERS OF STUDENTS PROMOTED AND CONTINUING IN NEXT GRADE
(In thousands)

Year	Grade	Total	Initial Enrollment Group Repeaters	Initial Enrollment Group Promoted from Year Before
(1)	(2)	(3)	(4)	(5)
1965	2	78.8	17.4*	61.4
1966	3	66.9	13.3*	53.6
1967	4	58.2	7.0*	51.2
1968	5	46.6	4.7	41.9
1969	6	41.8	3.0	38.8

Sources: Ministry of Education, Memoria de los Labores, 1969 - 70; and

* Documento 1 de la Reforma Educative, Anexo II ("Roberts Report").

This model makes no allowance for late registrations, which somewhat understates the estimated drop-out rate. But by the same token, the cost estimates of meeting the enrollment and attendance target are rendered more conservative. Late enrollment, as Roberts' data indicate, could run to as much as five percent between February and May for the primary system as a whole, with late-comers concentrated in the first grade.

If the computations underlying the cost estimates are anywhere near correct, student inflows for the cohort in the model, statistical artifact or not, should logically match the outflows that are shown for the six years under consideration. In effect, an estimated 93,000 new entrants in the first grade in 1964 roughly matched the sum of the 34,000 graduates from the sixth grade in 1969 plus the 59,900 deserters who dropped out along the way.

One assumes here that "holding patterns" for repeaters throughout the six grades remain relatively constant within short periods of years. This device permits members of the 1969 graduating class, who were first-graders in, say, 1963 or earlier, to serve as stand-ins for the repeaters of the "Class of 1964" who will be graduating with subsequent classes in 1970 or later. The evidence shows that for brief periods the number of repeaters varies in an irregular and unsystematic manner.

Similarly, laggards in school registration are excluded, whereas late entrants from previous cohorts have probably joined in. We assume the two effects compensate each other.

Further, the model utilizes total enrollments and repeating students, not solely those of the public sector. Since private schools account for only about four percent of primary grade students and also show smaller drop-out rates, the resulting cost differences in the budget must be negligible.

Finally, while the model is "diagonal"--following the statistical cohort through the years--conclusions drawn are "vertical" because they are applied to the budget of a current year. This assumes that the structure of this "cohort"--not only with respect to repeaters but also to drop-outs and retardation rates--is either typical or stable over short periods. In a growing system this may not be so, but we lack information about the direction of change. Fortunately the figures are fairly recent. We hope that our synthetic cohort is a close enough replica of reality to be informative.

The computations are serviceable for policy purposes, demonstrating as they do the dimensions of the cost that El Salvador would face in order to provide something like six years of compulsory primary education. The estimates are not satisfactory for a precise quantification of the problem, however. The source of the trouble lies in conflicting published and non-published primary data on student flows, a difficulty curable only by a lengthy investigation and reconciliation of voluminous statistics.

The figures used here come mainly from the original worksheets of the Statistical Section of the Min/Ed, supplemented in the early years of the time span 1964-1969 by data from the "Roberts Report." Data for drop-outs, as explained above, were derived from an analytic model capable of catching both intra- and intergrade desertions as a joint total. CONAPLAN's Economic and Social Indicators has published a series on drop-outs in the primary grades for both the public and private sectors without, however, reporting the definition or derivation of their series. The Min/Ed publishes no drop-out statistics as such.

Where parallel data on desertions exist, the various series differ among each other. The most substantial deviation is that shown by CONAPLAN in reporting drop-outs during the first grade. Quite likely the figure includes only students dropping out during the school year or those failing to take the final examinations, and excludes first grade graduates who fail to continue on. Differences in grades 2 - 6 are less serious. Unfortunately CONAPLAN does not provide related data on repeaters which might be used to cross-check their methods. The comparative Table A-4.2 below indicates the range of discrepancies.

APPENDIX TABLE A-4.2

SERIES ON DROP-OUTS IN THE PRIMARY GRADES: PUBLIC AND PRIVATE SECTORS

(In thousands of students)

Year	Grade	Speagle 1/	Roberts 2/	CONAPLAN
1964	1	31.7	32.7 3/	17.7
1965	2	6.2	9.2	7.7
1966	3	6.2	6.7	4.7
1967	4	8.1	n.a.	4.1
1968	5	4.1	n.a.	4.2
1969	6	3.6	n.a.	3.7
n.a. -	not available			

1/ No allowance for late enrollment.

2/ Adjustment for late enrollment.

3/ Drop-outs in first grade fell to 28.0 in 1965 but rose again to 32.8 in 1966.

Sources: Ministry of Education, Documento 1 de la Reforma Educativa, Anexo II ("Roberts Report"); CONAPLAN, Indicadores Economicos y Sociales.

APPENDIX V

THE RELATIONSHIP BETWEEN DESERTION AND REPETITION

In the model used we want to isolate repeaters, the target variable, from the impact of other factors such as population growth. Our purpose is not a forecast of the joint effect on costs of a host of variables all acting together. All we want to do is estimate savings due to fewer repeaters, other things constant.

The drawback of this procedure is the possibility that repetition may be functionally linked with another variable, such as drop-outs. In that event, repeaters and deserters have to be considered jointly. It is a safe guess, although data are missing, that many drop-outs are candidates for repetition. Conversely, an assumed reduction in the number of repeaters implies fewer drop-outs previously.

As was argued in an earlier section of this report, a lower desertion rate in, say, the first grade leaves costs relatively undisturbed because the mere act of enrollment fixes the provision of a student place. A student who leaves school merely creates unused capacity for the rest of the year. In other words, costs are largely related to enrollment, not to subsequent rates of daily attendance.

By contrast, every potential deserter and later repeater-in-grade who, because of Reform/ITV, stays the course and passes his examination, automatically saves the Min/Ed the cost of putting him through the same grade twice.

However, a further complication sets in: what if the former drop-out, because of his staying and passing, is retained in the system, perhaps to graduate from the sixth grade or higher? These added years of school-going, it may appear, are an added cost that should be chalked up against any savings from fewer years repeated. In the configuration just cited, the additional grades may well exceed any repeated grades saved. But as discussed in the text, this last supposition, incontrovertible in accounting logic, is highly questionable from an analytic standpoint and hence does not affect the conclusions of the model.

APPENDIX VI

CATCH-UP PROGRAM FOR YOUNG ADULTS

Another possible cost-beneficial feature latent in a rural education program is to shape its content so that graduates would be able to enter the seventh grade of junior high school upon successfully completing their course work. The purpose would be twofold: one, to relieve Salvadoran grade schools of their over-age and young adult students--16 years and older--who now constitute roughly six percent of enrollment; and second, to tackle the backlog of adults deficient in formal education of any kind.

That more mature people are different in mental outlook and motivation from six-to-twelve year olds is readily apparent. A different curriculum must therefore be fashioned for this age group. An opportunity to devise something like an adult version of Sesame Street presents itself to help adults learn the three R's at the same time that they acquire vocational skills, and do so in an entertaining manner.

The strategy involved in the above scheme is anything but new. The challenge for ITV is to take on this job and do it more effectively in terms of learning outcomes than it has been done conventionally.

A new cost difference comes into play, however, as the exodus of young adults from primary schools creates vacancies which may serve to absorb the deficit of school-age youngsters. Young adults, switching from the regular first six grades into the special evening program would thereby vacate a student place worth ₡85 annually in 1971 operating costs, not to mention investment outlays. Based on the number of students in primary school over 15 years of age, the maximum annual saving of a policy of diversion into a rural ITV program could be as much as ₡2.7 million. (Table A-6.1) The corresponding saving in initial investment outlays runs as high as ₡6.6 million at a maximum. This shift could be accomplished by legally closing grade schools to students beyond a given age bracket.

Given El Salvador's unquestionable need for a continuing primary school building program, the displacement of over-age students by youngsters of the proper school ages would relieve the pressure on classroom expansion. In practice things would work out flexibly. In the case of excessively crowded schools, expansion or replacement may be postponed or abandoned if the overage students were to leave. Here we would have the expected investment savings. Where space is less fully utilized, the departure of older pupils would have no effect on construction plans.

Realistically, one must take into account here that the upper grade classrooms, where over-age students converge, are the least densely occupied. Vacancies created would not necessarily be filled. Savings in that case would be illusory. Data on the actual situation are just now in process of being compiled. For the time being, reducing the possible operating saving by one-half of the maximum gives a figure of ₡1.3 million a year--acceptable, perhaps, on a provisional basis. Since such savings are logically deductible from any type of rural education program, however, ITV or conventional, they do not widen the advantage between the two, and cannot be counted as a payoff of ITV in the sense the term is used in this study.

TABLE A-6.1

SAVINGS OR COST OFFSETS AVAILABLE IN RELIEVING PRIMARY SCHOOLS OF OVER-AGE STUDENTS THROUGH RURAL EDUCATION OR CATCH-UP PROGRAM

A.	Savings in Operating Costs	
(1)	Annual Operating Cost per Student in Primary School (1971) 1/	¢ 85
(2)	No. of Students in Primary School, Age 16 and Over (1969)	31,300
(3)	Maximum of Savings in Operating Cost (1) x (2)	¢2,660M
(4)	Realizable Savings in Operating Costs: 50% of (3) 2/	¢1,330M
B.	Savings in Investment	
(5)	Construction Cost per Classroom (Based on 3-3-6, equipped, 1971 cost estimates) 3/	¢8,500
(6)	Construction Cost per Student (40 students per room) (5) ÷ 40	¢ 210
(7)	Maximum of Savings in Investment: (2) x (6)	¢6,600M
(8)	Realizable Savings in Investment: 50% of (7) 2/	¢3,300M
C.	Realizable Savings in Depreciation of Classrooms 2/	
(9)	Basis 40 year life (8) ÷ 40	¢80,000
(10)	Basis 20 year life (8) ÷ 20	¢160,000

1/ Based on Operating Budget of Ministry of Education for Primary School programs, with surchage for administrative overhead, divided by February enrollment.

2/ Reduced to allow for relatively low classroom occupancy in the upper grades so that vacancies would not create savings.

3/ As per Memorandum of Ministry of Education, COPLACE, to AID/ES, August, 1971. Includes construction, equipment and landscaping.

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